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BEFORE THE ARIZONA CORPORATION COMMISSION

TOM FORESE
CHAIRMAN
BOB BURNS
COMMISSIONER
DOUG LITTLE
COMMISSIONER
ANDY TOBIN
COMMISSIONER
BOYD DUNN
COMMISSIONER

IN THE MATTER OF THE APPLICATION OF ARIZONA PUBLIC SERVICE COMPANY FOR A HEARING TO DETERMINE THE FAIR VALUE OF THE UTILITY PROPERTY OF THE COMPANY FOR RATEMAKING PURPOSES, TO FIX A JUST AND REASONABLE RATE OF RETURN THEREON, TO APPROVE RATE SCHEDULES DESIGNED TO DEVELOP SUCH RETURN.	Docket No. E-01345A-16-0036
IN THE MATTER OF FUEL AND PURCHASED POWER PROCUREMENT AUDITS FOR ARIZONA PUBLIC SERVICE COMPANY.	Docket No. E-01345A-16-0123

NOTICE OF FILING

The Residential Utility Consumer Office ("RUCO") hereby provides notice of filing the Direct Testimony of Frank Radigan and Lon Huber on Rate Design, in the above captioned proceeding.

RESPECTFULLY SUBMITTED this 3rd day of February, 2017.

Daniel W. Pozefsky
Chief Counsel

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ARIZONA PUBLIC SERVICE COMPANY

DOCKET NOS. E-01345A-16-0036 and E-01345A-16-0123

DIRECT TESTIMONY OF FRANK RADIGAN
ON RATE DESIGN

ON BEHALF OF THE

RESIDENTIAL UTILITY CONSUMER OFFICE

FEBRUARY 3, 2017

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INTRODUCTION

Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.

A. My name is Frank W. Radigan. I am a principal in the Hudson River Energy Group, a consulting firm providing services in electric, gas and water utility industry matters, and specializing in the fields of rates, planning and utility economics. My office address is 235 Lark Street, Albany, New York 12210.

Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY IN THIS PROCEEDING?

A. Yes, on December 22, 2016 I submitted testimony on behalf of the Residential Utility Consumer Office ("RUCO") with respect to certain revenue requirement issues in this case. In this testimony I address other aspects of Arizona Public Service Company's presentation ("APS" or "the Company") with respect to revenue allocation and rate design. RUCO witness Lon Huber will also be submitting testimony with respect to rate design issues.

SCOPE OF TESTIMONY

Q. WHAT IS THE SCOPE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I have been asked to review the revenue allocation of the rate increase amongst service classes, the proposed changes to the limited income discount rates, the proposed grandfathering of existing distributed generation (DG) customers and the need for better, clearer and more thorough presentation of cost of service studies in future rate proceedings.

SUMMARY OF TESTIMONY

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. Based on its filed rate request APS would recover the overall average increase of 5.74% by allocating a 7.96% increase to the Residential Class and 3.34% to the General Service Class. As discussed infra, the Company bases this allocation proposal on the below average rate of return for the Residential Class, which it notes is largely driven by discounts being enjoyed by net metering customers. Based on my review of the Company's cost of service study, I would agree that the below average rate of return is based on the discounts being enjoyed by net metering customers and also due to other reasons, such as the discount given under the limited income discount programs. The discounts for net metering and the limited income discount programs should not be borne by the Residential Class alone, but by all customers, as both are public policy programs. When these corrections are made to the cost of service study the realized rate of return for the Residential Class increase, and I believe a more fair allocation, would be to allocate a 6.5% increase to the Residential Class and 5.6% to the General Service Class.

I also discuss the Company's proposed changes to the rate treatment of the limited income discount program and support the Company's position at this time.

I also discuss the Company's proposed rate treatment for the grandfathering for net metering customers with qualifying renewable generation and suggest that expressing the savings by some average cent per kWh on system production and applied to a customer's bill through a monetary credit or a simple credit based on

average historical savings per month, might be a much simpler approach than retaining already archaic service classes and encourage the Company to examine other and more simpler solutions while still maintaining the goal of the grandfathering provision (i.e. letting the customer retain the savings from making the initial investment in the generation).

REVENUE ALLOCATION

Q. WHAT IS APS' PROPOSAL FOR ALLOCATING THE PROPOSED REVENUE REQUIREMENT?

A There are two parts to the revenue increase, the revenue neutral transfer of $276.6 million from adjustor mechanisms to base rates and a $165.9 increase in base rates, for an overall increase in retail base rates of $433.4 million. The $165.9 million increase is the net increase that customers will see and it equates to an overall increase in rates of 5.74%. Company witness Miessner proposes that the Residential Class of customers receive a 7.96% increase and the General Service Class receive a 3.34% increase (See Miessner Direct at page 2). On a base rate basis, this allocation raises base retail rates overall by 15%, 19.3% increase for the Residential Class and 10.3% for the General Service Class (Ibid).

Mr. Miessner states that his proposed revenue allocation reflects the results of the cost of service study, being presented by Company Witness Snook, and the relative revenue deficiencies for each class (Ibid). The cost of service study shows that the Residential Class is earning a 2.26% rate of return compared to the overall average rate of return from retail customers of 4.46% and the rate of return from the General

Service Class of 8.99% (See Attachment LRS-04DR). Mr. Miessner also states that the requested net increase for the residential class of 7.96% is 2.22% higher than the overall average net increase of 5.74%, and this difference is substantially caused by the cost shift from the solar net metering program, where subsidized bill savings for solar customers create higher rates for everyone else (Ibid).

Q. PLEASE COMMENT ON THE PROPOSED REVENUE ALLOCATION.

A. I have reviewed the cost of service study and the inputs to it. Based on my review, I note that there are several issues with the costs of service study and the inputs that make up the allocation factor. There are three issues with how the Residential Class is treated which directly impact the results of the study and, therefore, impact the proposed revenue allocation to service classes. First is the treatment of lost revenues due to net metering. As Mr. Miessner acknowledges, the lower than average rate of return by the Residential Class is largely due to the lost revenues due to net metering. This is natural because many of the costs allocated to the Residential Class are based on the non-coincident peak, which generally occurs during the evening hours when solar production in on the wane. As such, the cost responsibility for a customer with a solar system is the same, or almost the same, as any other residential customer, except these customers use somewhere between 5,000 to 8,400 kWh less energy. As the current cost recovery mechanism is a volumetric rate, this lower energy usage reduces revenues and drives the realized rate of return downward.

The problem that I have with the cost of service study, as presented, is that it takes no notice that the decision to net meter customers with qualifying renewable generation is a public policy decision and not something intrinsic to serving any residential customer. Only 3% of residential customers have solar systems and their average bill per year is $764 (See Schedule H-2, page 1 of 3). While the average bill for a residential customer without solar is $1,441. This results in a $22 million loss in revenues which, since the cost serve both sets of customers is relatively the same under current cost allocation methods, the loss goes directly to reduce the realized rate of return for the whole Residential Class.

In the last APS rate case, there was a term in the settlement agreement that lost revenues from the Lost Fixed Cost Recovery Mechanism would be recovered from residential customers (Decision No. 73183 Attachment F). However, lost revenues, from net metering, are just lost revenues due to public policy and that policy does not only apply to residential customers. Net metering was allowed because people believed that promoting solar would benefit all customers as it would avoid future investment in generation and transmission. As such, these lost revenues should be shared among all customers and not just residential. If this were reflected in the cost of service study, then the unitized rate of return from the residential class would rise and there would be less of a need for the residential class to receive an above average increase.

As noted above, the co-mingling of non-solar and solar customers for cost of service purposes can clearly give inaccurate results as the cost recovery for solar

customers' needs to be realigned, given that the Value of Solar Docket is scheduled to end soon[1]. By the time the Company files its next rate case there will be much more information available as to what the costs and value of solar are to be used for both revenue allocation purposes as well as rate design. To that end, the Company should be directed to serve customers with qualifying renewable generation under their own separate service class with the rate design proposed by RUCO witness Lon Huber.

Q. PLEASE CONTINUE YOUR DISCUSSION OF THE COST OF SERVICE STUDY RESULTS.

A. The second issue I have with the cost of service study is the treatment of the lost revenues due to the limited income discount program for residential customers. As will be discussed infra, APS offers two rate discount programs for certain customers with limited income. The E-3 rate rider provides bill discounts for customers that are within 150% of the federal poverty level and the E-4 rate rider provides a higher bill discount for similarly situated customers with certain qualifying medical equipment that uses a lot of electricity. The customers taking service under these rate plans get simple discounts to their bill which averaged, in the test year, $34 per month for an E-3 customer and $57 per month for an E-4 customer. APS calculated that these discounts costed approximately $36 million in 2015 and are forecast to grow to $48 million by the time new rates are set. Funding for the discount is made via the Systems Benefits Charge via a $/kWh charge from all classes.

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[1] Docket No. E-000001-14-0023- In the Matter of the Commission's Investigation of Value and Cost of

While the funding is recovered from all classes, in the cost of service study, costs are first allocated to classes and then compared to the necessary funding. As such, the cost to serve these limited discount customers are allocated to the residential class, but only the residential class' portion of the system benefit revenues are reflected in the cost of service study. Without the reallocation of the System Benefit Charge Revenues to the Residential Class, the allocation of cost in one manner but the recovery of costs in another, understates the realized rate of return of the residential class and overstates the realized rate of return for all other classes.

Q. PLEASE CONTINUE.

A. The third issue is that APS allocates the revenue increase by major rate category (i.e. Residential and General Service) but allocates costs to those major rate categories by the summation of costs allocated to their subclasses. Costs allocated to service classes at the distribution service level are heavily influenced by their non-coincident peak or the summation of individual peaks of customers, and these can vary from subclass to subclass. For example, service class E-12 which has the most customers has an individual maximum demand based on its usage in December while ET-2 individual maximum demand is based on its usage in August. This mixing of allocating costs one way, but allocating the revenue increase another, can lead to an over allocation of costs to a particular class for the service

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Distributed Generation (Value of Solar).

category most vulnerable to this, the Residential customer. Again, this understates the realized rate of return for the Residential Rate Category.

Q. WHAT WOULD YOU RECOMMEND FOR REVENUE ALLOCATION IF THE COMPANY WERE GIVEN ITS PROPOSED REVENUE INCREASE?

A. Based on the discussion above, the results of the cost of service study are unfairly skedded against the Residential Class. That said, even with these problems, the Residential Rate Category is earning a rate of return of 2.26% compared to the overall average of 4.46%. Even after correction, the Residential rate category would get a larger than average increase. RUCO would recommend an overall average increase to Residential of 6.5% and 5.6% to the General Service Class, compared to the overall average increase of 5.74%.

LIMITED INCOME BILL DISCOUNT PROGRAMS

Q. WHAT IS APS PROPOSING WITH RESPECT TO THE LIMITED INCOME BILL DISCOUNT PROGRAMS?

A. APS provides two bill-discount programs for customers with limited income. The E-3 rate rider provides bill discounts for customers that are within 150% of the federal poverty level. The E-4 rate rider provides a higher bill discount for similarly situated customers with certain qualifying medical equipment that uses a lot of electricity. The discounts start at 65% for bill in the 0-400 kWh block and reduce as usage goes up. Past a certain point (1,201 kWh for an E-3 customer and 2,001 kWh for an E-4 customer) the discounts become capped at a $ per bill discount with the cap for an E-3 customer at $31.75 per bill and for an E-4 customer a cap of $60 per bill.

APS proposes to replace this with a flat discount of $34 for an E-3 customer and $57 for an E-4 customer (See Miessner Direct at 39:19-25 – 40:1-6). In both cases, the proposed cap reflects the average discount received by customers during the test year (Ibid). Currently the two programs cost $11 million per year and APS anticipates that it will increase to $24 million (See Miessner Direct at 38-39). Funding is recovered on a $/kWh charge from all rate classes through the System Benefits charge (Ibid).

Q. DO YOU AGREE WITH THE APS PROPOSAL?

A. Absent any challenge from any other party, I believe APS proposal makes sense in that its goal is to preserve the discount currently being received by customers while at the same time making it easier to administer.

GRANDFATHERING OF DG CUSTOMERS

Q. WHAT IS APS PROPOSING WITH RESPECT TO GRANDFATHERING OF CUSTOMERS WITH RENEWABLE GENERATION?

A. Company witness Miessner proposes to grandfather existing partial requirements customers with qualifying renewable generation, such as solar, to their current existing rate structure (Miessner Direct at 25:19-26). These current rate structures are the E-12 inclining block, ET-1 and ET-2 time-of-use energy and ECT-IR and ECT-2 time-of-use demand (Ibid). This grandfather would apply to existing qualifying partial requirement customers or customers who have provided a complete interconnection application, before the date that new rates take effect in

this case, i.e. July 1, 2017, and would last for 20 years from the customer's initial interconnection date (Miessner Direct at 46). APS also proposes a list of administrative rules to the grandfathering[2] and some rules on pricing provisions[3].

Q. DOES APS' PROPOSAL COMPORT WITH THE RECENT RECOMMENDED OPINION AND ORDER IN THE VALUE OF SOLAR DOCKET[4]?

A. Yes, by a strict interpretation of the Value of Solar ROO, in that one of the ordering paragraphs stated that qualifying renewable generation customers will be considered to be fully grandfathered and continue to utilize currently-implemented rate design and net metering (Value of Solar ROO at 171). Having said that, I believe one must also read and consider all of Company Witness Miessner's testimony as well as the testimony of Company Witness Snook before a final determination on this issue can be made. Company Witness Miessner is proposing eliminating service classification E-12 and it would only be retained for the customers with qualifying renewable generation (See Miessner Direct at pgs. 21-37). He also proposes to eliminate the two volumetric TOU residential service classes, ET-1 and ET-2, and replace them with a new TOU rate with a small

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[2] APS would also requires that customers may not 1) add additional solar to their home or facility, or 2) move their solar generation unit to another site. APS would allow: the customer to remain on their current retail rate but may not move between alterative grandfathered retail rates, transfer the grandfathering provision to a new customer purchasing the home.

[3] The customer will be subject to 1) changes in annual adjustor rates including the rate structure and level, 2) any existing charges specific to partial requirements customers, such as grid access charges, will continue to apply, and 3) the annual purchase rates for net metering will continue to be based on near term avoided costs as revised from time to time.

[4] Docket No. E-000001-14-0023- In the Matter of the Commission's Investigation of Value and Cost of Distributed Generation, Recommended Opinion and Order issued October 7, 2016 ("the Value of Solar ROO")

demand charge (Ibid at page 24). He also proposes to replace the two existing residential TOU rates with demand charges, ECT-1R and ECT-2, with a revised TOU rate with a demand charge (Ibid at page 25).

These proposals are part of a Long Range Rate Plan ("the Rate Plan") sponsored by Company Witness Snook that seeks to modernize the retail rate structure going forward (See Miessner Direct at page 6 and Exhibit LRS-05DR). The Rate Plan seeks to introduce a universal three-part rate using the customer's maximum measured use in a single on-peak hour (Ibid at page 12 of 16).

Q. PLEASE COMMENT ON THE COMPANY'S PROPOSAL?

A. Mr. Miessner proposal to retain five service rate options, that would only be available to the customers with qualifying renewable generation and retain these rate options for 20 years, seems overly burdensome at a time when the Company is seeking to modernize its rate structure. When one considers that a current E-12 customer with solar consumes an average 3,288 kWh per year, while the average E-12 customer without solar consumes 8,125 kWh per year, the difference between the two customers is an average reduction in energy consumption of approximately 400 kWh per month. For an E-12 customer using 800 kWh per month in the summer, a 400 kWh reduction would eliminate the usage in the second tier of the energy charge and reduce the customer's bill by 13.8 cents per kWh or $55.20 per month. In the winter, a 400 kWh reduction would reduce the customer's bill by 9.4 cents per kWh for a savings of $37.60 per month. Expressing the savings by some average cent per kWh on system production and applied to a customer's bill

through a monetary credit or a simple credit based on average historical savings per month might be a much simpler approach than retaining already archaic service classes.

While I recognize this would take some analysis as different customers installed a variety of different systems with different characteristics but with work similar to what the Company is proposing for the limited income discount programs, they could propose a simpler solution while still maintaining the goal of the grandfathering provision (i.e. letting the customer retain the savings from making the initial investment in the generation).

Q. DOES THIS CONCLUDE YOUR RATE DESIGN TESTIMONY?

A. Yes, it does.

ARIZONA PUBLIC SERVICE COMPANY

DOCKET NOS. E-01345A-16-0036 and E-01345A-16-0123

DIRECT TESTIMONY OF LON HUBER
ON RATE DESIGN

ON BEHALF OF THE

RESIDENTIAL UTILITY CONSUMER OFFICE

FEBRUARY 3, 2017

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INTRODUCTION

Q. Please state your name, position, employer and address for the record.

A. Lon Huber. I am a Director at Strategen Consulting, LLC located at 2150 Allston Way #210, Berkeley CA 94704.

Q. Please state your educational background and work experience.

A. My career in the energy industry began in 2007, when I started working at a research institute housed within the University of Arizona. In 2010, I became the governmental affairs staffer for TFS Solar, a solar photovoltaic ("PV") integration company based in Tucson. I was hired by Suntech America in 2011, where I led the company's regulatory and policy efforts in numerous US states until December 2012. In 2013, I served as a consultant for the Residential Utility Consumer Office ("RUCO") on energy issues. I joined RUCO as a full time employee in January 2014. Since March 2015 I have worked at Strategen Consulting where I continue to advise RUCO on energy policy matters. I obtained a Bachelor of Science Public Administration degree in Public Policy and Management from the University of Arizona in 2009. I also received a Master's of Business Administration from the Eller College of Management at the same university. A full resume is attached in Exhibit LH-1.

Q. What is the purpose of your testimony?

A. My testimony will address the Company's rate design proposals and present RUCO's proposed rate design and policy.

Q. How is your Direct Testimony organized?

A. I intend to first provide a summary of RUCO's position, then address the testimonies of witnesses Faruqui, Snook, Derstine, and Miessner together in the following format:

1. Summary of RUCO's recommendations
2. Rate design for all residential customers:
    a. Basic Service Charge
    b. Mandatory Demand Charges
    c. RUCO's recommended rate options for standard residential customers
    d. Plan for transitioning to new rates
3. Rate design for partial requirements customers or advanced DG customers
4. Other policy issues

SUMMARY

1. RUCO's Main Recommendations

Q. What is RUCO's recommendation regarding fixed charges for residential customers?

A. RUCO recommends a Basic Service Charge (BSC) for APS' residential customers in the $8 to $10 range.

Q. What is RUCO's recommendation for a default rate for standard residential customers?

A. RUCO recommends against approving the Company's proposed mandatory demand charges for residential customers. Instead, RUCO recommends building on the Company's past success with time-of-use (TOU) adoption by placing all customers over 600 kWh in monthly usage to a default two-part TOU rate. RUCO suggests four different TOU rate options be available to residential customers. Two of these would be volumetric only and the two others would be three part rates. The selection of which customers from today's non TOU rate plans go to which new rate offering is discussed in testimony. A robust transition, education, and empowerment plan would accompany these rates.

Q. What rate design does RUCO propose for partial requirements customers or advanced distributed generation (DG) customers?

A. RUCO proposes offering several different rate plans for new DG adopters and partial requirement customers. RUCO defines partial requirements as any customer that installs electricity producing technology totaling more than 25% of their annual load. The default rate for partial requirements customers would be a three-part rate with an export rate set by the prevailing resource cost proxy (RCP). The customer can opt-out and choose to be on a fully volumetric TOU with an on and off peak adjustment to the RCP export rate. Next, RUCO would be open to a buy-all, sell-all rate, known in Arizona as the RPS credit option. This rate could start at a RCP derived value but might decline faster for new customers than the

10% yearly RCP cap. In exchange, a customer would be locked in for 20 years. Finally, RUCO is proposing an experimental storage rate design. This offering would be structured to maximize peak demand reduction price signals.

2. Rate design for all residential customers

a. APS' Proposal to Significantly Increase the Basic Service Charge

Q. What changes does APS propose for the Basic Service Charge for all residential customers?

A. APS proposes a 67% to 177% increase in the Basic Service Charge (BSC) depending on which rate option the customer is placed on. For most residential customers the BSC would increase from the current $8.67 per month to either $14.50, $18, or $24 per month.

Q. How will one of these charges be selected?

A. APS will select a rate plan for the customer unless the customer proactively chooses one.

Q. Have there been other recent proposals in Arizona to increase fixed charges?

A. Yes. Both UNS Electric[1] and Tucson Electric Power[2] recently made similar proposals to increase the basic service charge from $10 to $20.

[1] Docket No. E-04204A-15-014
[2] Docket No. E-01933A-15-0322

Q. What was the outcome of these proposals?

A. UNS Electric's initial proposal was rejected and a significantly lower BSC was approved. A decision on TEP's proposal is still pending at the time of this filing, however a Recommended Opinion and Order was recently issued by the ALJ which supported RUCO's proposal in that case. Below is a summary of the recently approved and recommend basic service charges for UNSE and TEP. For comparison, APS' proposal is also illustrated to show that it is significantly higher than the recently approved and recommended BSCs.

Residential Service Category	Previous/Current BSC	New BSC	Status	Percent Change
UNSE (Time-of-Use)	$11.50 (previous)	$12	Approved	4%
UNSE (Standard)	$10 (previous)	$15	Approved	50%
TEP (Time-of-Use)	$11.50 (current)	$10	Recommended	-13%
TEP (Standard)	$10 (current)	$13	Recommended	30%
APS (E-12)	$8.67 (current)	$14.50 - $24.00	Proposed	67% - 177%

Q. Has RUCO adopted a general position regarding fixed customer charge increases?

A. RUCO is a member of the National Association of State Utility Consumer Advocates ("NASUCA"), which has taken a position on this issue.

Q. What is NASUCA?

A. NASUCA is an association comprised of many consumer advocates from numerous states and the District of Columbia. NASUCA's members are designated by the laws of their respective jurisdictions to represent the interests of utility consumers before state and federal regulators and in the courts.

Q. What is NASUCA's position on increased fixed customer charges?

A. NASUCA recently adopted resolution 2015-1, which opposes utility efforts to increase fixed customer charges. I have included a copy of this resolution with this testimony (Exhibit LH-2).

Q. Do others identify potential issues regarding increased fixed charges?

A. Yes. For example, the Company's witness Dr. Faruqui identified the following issues, among others, in a recent presentation he gave[3]:

- "An increase in the fixed charge will automatically penalize low income customers, because they are small customers"
- "Long-run marginal costs are almost all variable, so fixed charges are not cost-based"
- "Fixed charges do not appear in competitive markets, so utilities should not be allowed to offer them"
- "Fixed charges will reduce the incentive for energy efficiency"

[3] Residential Demand Charges: An Overview, presentation to EEI Rate Committee Meeting, March 2016, http://www.brattle.com/system/publications/pdfs/000/005/276/original/Residential_Demand_Charges_An_Overview.pdf?1458061233

In the same presentation, Dr. Faruqui indicates that "increasing the fixed charge is difficult," particularly for smaller customers, as illustrated in the chart below.

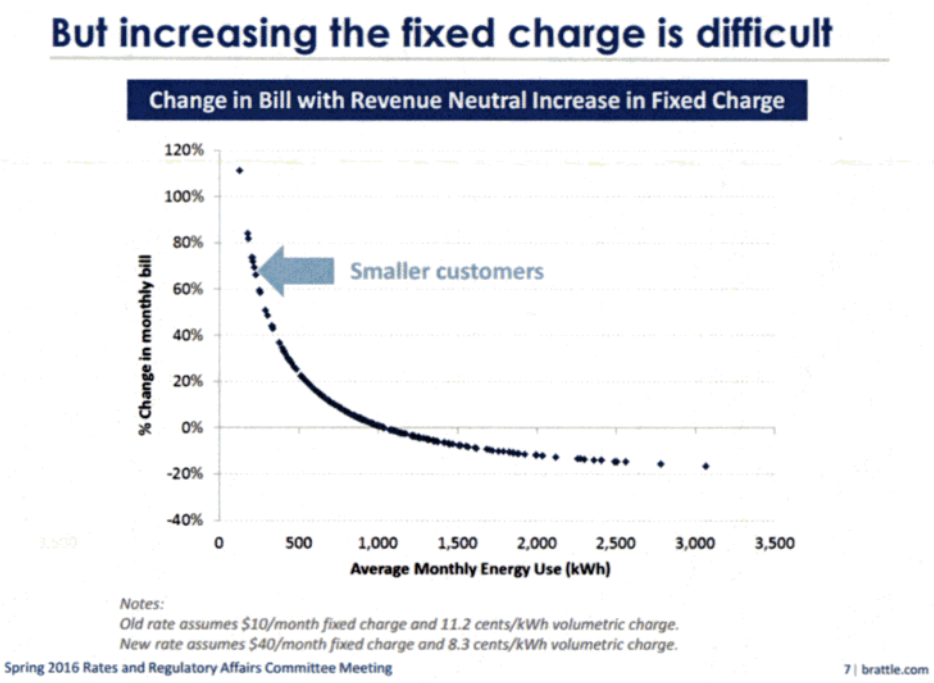

Figure 1[4]

RUCO agrees with Dr. Faruqui that these are some of the many difficulties with increasing fixed charges.

Q. What are RUCO's concerns with increased fixed customer charges such as that proposed by APS?

A. RUCO has several concerns regarding increased fixed charges including reduced control over customer bills, disproportionate impacts to low-use and low-income

[4] Ibid.

customers, and reduced benefits to all ratepayers from energy efficiency and conservation.

Q. How does the proposed increase to the BSC reduce the ability for customers to control their bill?

A. Under the Company's proposal, a significantly greater share of each customer's bill will be collected through a fixed charge as opposed to a usage-based rate. Thus, if the Company's proposal were adopted, each customer would have a much smaller portion of the bill over which he or she has control. For example, Attachment CAM-3DR of Mr. Miessner's testimony demonstrates that an average bill for an APS residential customer would be about $139.32 under current rates, with $8.67 recovered through the basic service charge and $150.41 under proposed rates, with $14.50-24.00 recovered through the basic service charge. This means that under current rates, customers are unable to control 6% of their electricity costs, but under the proposed rates they would be unable to control 10-16% of their electricity costs. Thus, under the Company's proposal there would be a significant increase in the portion of customers' bills over which they would have not be able to manage through energy efficiency and conservation, demand reduction, or other means. Additionally, by proposing to recover more of the Company's revenue requirement through a fixed charge, the resulting usage-based rates (including both $/kWh and $/kW) will be lower than they otherwise might have been. Lower usage-based rates dampen the price signal customers receive, thereby reducing the incentive for customers to take steps to reduce

energy consumption or reduce demand. RUCO supports strong incentives for customers to reduce energy consumption and demand (e.g. through energy efficiency measures) due to the significant benefits this can bring to all ratepayers. As such, RUCO does not support the Company's proposal to recover an increased share of its costs through fixed charges. The higher the fixed charge component of the rate, the less incentive customers will have to pursue actions that reduce overall system costs.

Q. Can you provide an example of this?

A. Yes. As an example, let's consider a hypothetical customer for whom the cost to serve is $100 in revenue requirement, and the customer uses 1000 kWh per month. Many potential rate options exist to collect the revenue requirement. For example, the revenue could be collected through an $8 per month fixed charge combined with a $0.092/kWh volumetric rate, or a $24 per month fixed charge with a $0.076/kWh volumetric rate. However, the two options differ in the incentive for customers to reduce energy consumption. A 100 kWh reduction in energy use would yield 9.2% bill reduction in the first case, but only 7.6% bill reduction in the second case.

Q. Has RUCO considered how the Company's proposed basic service charge would impact limited income customers?

A. Yes. In general, limited income customers also tend to be low-use customers. Thus, any proposal that has a greater impact on low-use customers will also have

a greater impact on limited income customers. Meanwhile, proposals to increase fixed charges often have a greater impact on low-use customers since the fixed charge makes up a larger portion of their bill.

Q. Has RUCO compared the impact of the Company's proposal on low-use versus high-use residential customers?

A. Yes. For the 25% of residential customers currently on the default rate with the lowest usage (<300 kWh, summer), the typical summer bill increase would be >30%. Meanwhile, for the 17% of residential customers on the default rate with the highest usage (>1,200 kWh), summer bills would actually *decrease*. The increase for low-use customers is partly due to the significant increase in the basic service charge. RUCO is particularly concerned with this higher impact on low-use customers since many of these customers are on fixed incomes and have less ability to increase payment for electric service without decreasing payment for other fundamental needs (e.g. food, medicine, etc.). In RUCO's view, the proposed basic service charge increase is a regressive policy that is harmful to Arizona's most vulnerable population

Q. What about APS' proposal to include a special rate option for small-use customers (R-XS)?

A. RUCO appreciates APS' special consideration of small use customers and generally supports this concept. However, RUCO strongly opposes the proposed 115% increase in the BSC (from $8.67 to $18) that APS has proposed for these

customers. This would result in a fixed charge comprising roughly half of a customer's bill for the 25% of residential customers on the default rate with lowest usage.

Q. Are all low use customers also low income customers?

A. Not necessarily. RUCO acknowledges that some low usage customers may not necessarily be lower income, particularly those that seasonally occupy their homes. However, according to one recent study, low income customers in three western utilities had usage 17%-27% lower than non-low-income customers while results in the Midwest and East were mixed. This study attributes this disparity to "differences in housing stock and reliance on energy-intensive heating and cooling units."[5] Thus, RUCO believes the Commission should proceed with extreme caution when considering rate design options that could disproportionately affect low use customers, since they could also disproportionately affect low income customers.

Q. How can APS fairly recover fixed costs from low usage customers that are not also low income customers?

A. Many homes in the Phoenix area are only seasonally occupied during the winter. These customers are away from the area during summer and do not contribute to summer season peak, but also contribute less to overall recovery of fixed costs.

[5] ACEEE, Myths of Low-Income Energy Efficiency Programs: Implications for Outreach, Serj Berelson, 2014 http://aceee.org/files/proceedings/2014/data/papers/7-287.pdf

A seasonal rate option, for certain low use customers that are not low income, may be able to help ensure fair recovery of costs without jeopardizing low income customers. Several other utilities have a seasonal use rate that provides a minimum bill during times when a home may be unoccupied. Under this option, customers would aid in fixed cost recovery in a manner that is more aligned with year round customers. This approach would also be compatible with targeted assistance programs for low income customers.

Q. How do increased fixed charges reduce potential ratepayer benefits from energy efficiency and conservation?

A. Actions taken by customers to reduce energy consumption provide positive benefits to all ratepayers both in the form of avoided short run marginal costs (e.g. fuel costs) as well as avoided long term capital investments (e.g. generation capacity). For example, investments by APS customers in energy efficiency have contributed to over 600 MW of peak reduction for APS over the last 9 years, thereby helping to avoid the need to purchase or build expensive new generation capacity.[6] Thus, there is ample justification to maintain reasonable volumetric rates since that will encourage customers to pursue sustained energy reductions over time and help to avoid costly new generation equipment. In contrast, there are virtually no beneficial actions that would be encouraged by a higher fixed charge. Utilities and regulators have some discretion to choose whether to recover costs in fixed rates or volumetric rates. However, for reasons stated above, and

[6] APS 2015 DSM Annual Progress Report filed in Docket No. E-00000U-16-0069. Table 5 (p 7)

elsewhere in this testimony, RUCO believes there are far more reasons why healthy volumetric rates should be preferred for standard residential customers over higher fixed charges.

Q. Do APS and the Commission have discretion in setting the level of the BSC, and the corresponding portion of fixed costs recovered through this mechanism?

A. Yes. This is readily apparent in the fact that the Company has proposed three different levels of BSC, depending on which of the new rate plans the customer is placed on. The Company proposed this despite the fact that "The cost of service for customer–related costs for R-1, R-2, and R-3 would be the same per customer."[7]

Q. Is APS able to recover a portion of customer-related fixed costs through volumetric rates, rather than fixed charges?

A. Yes. In fact, APS confirmed that its proposal is designed to do this[8].

Q. What costs should be recovered through the Basic Service Charge (BSC)?

A. At a maximum, only those costs that are "customer related" -- that is, they reflect the minimum incremental costs necessary to provide service to a new customer. This includes the cost of meters, meter reading, billing, and the service drop. Any

[7] APS response to RUCO 7.9
[8] APS response to RUCO 7.10

costs related to joint infrastructure that is shared among multiple customers should not be considered for recovery through the BSC.

Q. What costs does APS intend to recover through its proposed Basic Service Charge?

A. According to Direct Testimony of Charles Miessner (pages 31-32), APS believes it is appropriate for the Basic Service Charge to recover the following categories of costs:

- Service drop
- Point-of-delivery equipment
- Meters
- Meter reading system
- Billing system and related costs needed to produce a monthly bill
- Customer care system and related operating costs
- Overhead costs for grid operation
- Communications and cyber security equipment
- Grid equipment such as distribution transformers

Q. Does RUCO agree that all of these costs should be recovered through the Basic Service Charge?

A. No. Several of the cost categories described are shared infrastructure that is used to serve multiple customers (e.g. communications and cyber security equipment, distribution transformers, and overhead costs). These categories are not directly

linked to providing service to an individual customer and would not necessarily increase if a new customer were added to the system. Therefore, they should not be recovered through the BSC.

Q. Does APS' Cost of Service Study (COSS) presented in its testimony identify the costs to serve residential customers that are "customer related" and should be considered for recovery through the BSC?

A. Yes. APS reports a total revenue requirement of $192,324,610 for residential customers that is classified as "customer related" for the 2015 Test Year.[9] This equates to a monthly cost per customer of $15.13.[10]

Q. What does RUCO conclude from this analysis?

A. RUCO concludes that APS' proposal to impose a BSC as high as $18 or $24 per month should be rejected on its face. Even APS' own COSS does not support a charge that is this high.

Q. Does RUCO believe a BSC of $15.13, as suggested by APS' COSS, is appropriate?

A. No. RUCO believes this level is still too high. RUCO does not believe APS' COSS as presented should be relied upon as the basis for establishing the BSC.

[9] See Page 102 of LRS_WP04DR, line 23

[10] Based on 1,059,292 total residential customers as reported in page 13 of LRS_WP05DR

Q. Please explain RUCO's concerns with APS' COSS.

A. RUCO is concerned that APS' COSS has over-allocated certain costs to the "customer related" category for residential customers in an attempt to justify a higher BSC. For example, APS' COSS estimates metering costs for residential customers to be $81.5 million, or about $6.41 per customer per month. After examining the COSS, RUCO believes the monthly cost per customer for metering is more likely to be in the $3.50 to $4.00 range. Other utilities with similar metering infrastructure such as Salt River Project have reported that the "meter" component of the Monthly Service Charge to be as low as $2.10 per customer -- substantially lower than APS (see SRP's 2015 rate book, http://www.srpnet.com/ratebook). RUCO recognizes that SRP has a different cost structure than APS, but does not believe that accounts for such a substantial difference.

Additionally, APS' COSS indicates that a significant portion (over 40%) of all residential customer-related costs stem from the categories of "Customer Accounts" and "Customer Service & Info and Sales." Although these categories include the typical customer-related items of Meter Reading and Billing, over 80% of the costs reported appear to reflect other costs above and beyond those traditional items. Notably, APS' COSS assigns these items entirely to the customer-related category. Thus, any costs included here are likely to have a substantial impact on the BSC calculation. For example, RUCO estimates that if these line items only included Meter Reading and Billing it would reduce the BSC calculation by over $5.

Furthermore, APS indicated that it intends to recover certain grid costs, including distribution transformers through the BSC. Transformers on the distribution grid are generally shared between multiple customers and should not be recovered through the BSC since they are not attributable to serving a single customer (and no others). RUCO believes it is inappropriate to recover shared distribution infrastructure costs through the BSC. Additionally, APS was not able to identify how many (if any) distribution transformers on its system serve only one customer and no other customers[11].

Finally, APS appears to have included certain overhead, administrative, and intangible costs in all of the customer related costs categories. In general, RUCO does not agree with this approach since these fall under the category of "shared infrastructure" and are not attributable to providing service to a single customer.

Q. What does RUCO believe a more appropriate BSC for APS should be?

A. RUCO estimates that an appropriate BSC is likely in the $8-10 range, depending on whether or not certain Customer Account costs are included (other than billing and meter reading). Below is a unit cost comparison of the customer-related costs as estimated by APS and RUCO, matched with the corresponding FERC account. APS was unable identify the FERC accounts associated with each functional category in its COSS, so these represent RUCO's best interpretation of the FERC

[11] APS response to RUCO 7.8

accounts corresponding to the descriptions given. For comparison purposes, the same elements are included from TEP's 2015 Marginal COSS.

	FERC Accounts	Revenue Requirement ($/customer/month)		
Description (FERC Accounts)		**APS COSS Estimate[12]**	**RUCO Estimate for APS**	**TEP Marginal COSS[13]**
Meters	370, 586	$6.41	$3.70	$3.10
Services - Overhead/Underground	369, 587	(not provided)	$3.02	$1.72
Customer Accounts: Meter Reading	902	$0.27	$0.27	$0.30
Customer Accounts: Billing	903	$0.90	$0.90	$3.44
Customer Accounts: Other	901, 904, 905	$7.29	$0 to $2.50	$0
Customer Service & Information	907-910		$0.06	$0.06
Sales	911-916		$0	$0
A&G	920-935	(not provided)	$0	$1.72
Total Customer-Related		**$15.13**	**$7.95 to $10.45**	**$10.34**

Q. Does APS suggest that certain shared costs should be recovered through the BSC?

A. Yes. In its testimony APS states that "overhead costs such as grid operations, communications and cyber security equipment should also be recovered through

[12] Based on APS response to Staff 5.23 and LRS_WP04DR, p 101-102. Note that the total was derived from the total customer-related revenue requirement reported on p 102.
[13] TEP Marginal COSS 2015, Docket No. E-01933A-15-0322, exhibit CAJ-1

the service charge because they are not driven by the size of a customer's electrical usage."[14]

Q. Does RUCO agree with APS that any costs not related to electrical usage (either energy or demand) should automatically be designated as a customer-related cost?

A. No. RUCO believes this is a flawed approach to cost allocation. There are many costs that utilities incur that cannot be easily classified as energy-, demand-, or customer-related. Simply assuming costs are customer-related if they are not driven by usage is inappropriate and harmful to customers. This particular pitfall of cost allocation was well-articulated by Bonbright, who explained that there are certain fixed costs that belong neither to the demand- nor the customer-related categories and are instead "strictly unallocable." Moreover, he observed that cost analysts are often "prisoners of their own assumption that the sum of the parts equals the whole. They are therefore under impelling pressure to fudge their cost apportionments by using the category of customer costs as a dumping ground for costs that they cannot plausibly impute to any of their other cost categories."[15]

The challenge for utilities and their regulators is that there may be no perfect way to recover certain embedded fixed costs. Indeed, some costs cannot readily be assigned to the energy, demand, or customer related categories and we should be wary of how such costs are classified. In cases where the category is unclear,

[14] Direct Testimony of Mr. Miessner at page 32
[15] Bonbright et al., 2nd edition, page 492

RUCO believes the best policy is to avoid treating these costs, like shared infrastructure, as customer related.

Q. How does RUCO believe "shared infrastructure" should be defined?

A. RUCO believes that any common facility that has the potential to be shared by multiple users should not be classified as a customer-related cost, and therefore should not be recovered through a fixed customer charge. Failure to provide this clear boundary would create a slippery slope whereby any common facility – all the way up to the power plant – could be labeled as a "customer cost." Such an outcome is neither fair nor logical, and would not promote efficient consumer behavior. Customer costs should not be a catch-all category for 'related costs' and non-energy items.

Q. On what basis should the costs of shared infrastructure be recovered?

A. RUCO believes that shared distribution costs should be recovered based on "benefits received."

Q. Please explain why "benefits received" is a sound basis for recovery of shared costs.

A. In most forms of shared infrastructure in the civic sector, costs are recovered either through usage fees (e.g. bridge tolls) or taxes (e.g. property taxes). The latter reflects the notion of a customer's "ability-to-pay" while the former reflects the notion of "benefits-received" by the customer. While recovery of costs through an

ability-to-pay approach (e.g. through tax subsidies) is common for municipal utility systems (e.g. water and sewer), it is not practically feasible for privately owned utilities. This leaves benefits-received as the primary basis for recovering shared infrastructure from private electric utilities. Meanwhile, the best measure of benefits-received for an electric utility is the volume of energy consumption.

Q. Can you please provide an example?

A. Yes. Consider two customers on a shared distribution system that are similar in all respects, except that one draws 5 kW of electricity 24 hours a day, 7 days a week, while the other only operates for eight hours a day. Under this scenario, the 24-7 customer is receiving more benefits from the shared distribution system. It is therefore appropriate for the 24-7 customer to pay a greater share of the costs due to their higher usage of the system. A usage based rate (e.g. $/kWh) would properly reflect this.

Q. Does RUCO support APS' proposal to implement a flat bill rider?

A. No. RUCO does not support this concept. This would be equivalent to a 100% fixed charge.

Q. APS' Long-Range Rate Plan (LRS-05DR, page 2) states that the ideal rate structure would "diversify the recovery of fixed costs through both a basic service charge and a demand component, recovering only fuel costs through the more traditional volumetric energy rate." Does RUCO agree with this statement?

A. No. There is no scientific rule that fixed charges or demand charges must be used to recover fixed costs. Moreover, there is no scientific rule regarding the extent of fixed costs that should be recovered through these mechanisms. Instead, there is a great degree of subjectivity in how rates can be designed to recover fixed costs and many policy considerations that must be balanced.

b. APS' Proposal to Impose Mandatory Residential Demand Charges

Q. Please summarize the Company's proposed rates as they relate to demand charges.

A. APS proposes to impose mandatory demand charges for nearly all residential customers. The Company's proposal would require all residential customers >600 kWh to move to one of three three-part time-of-use rates each with demand charges. All of these residential customers would be subject to the proposed demand charges from 3 pm to 8 pm. An optional rate would be available for low-use customers and does not include a demand charge.

Q. Have other utilities introduced mandatory demand charges on all residential customers?

A. According to data compiled by APS Witness Faruqui, only three utilities in the U.S. have mandatory demand charges for all residential customers[16]. All of them are small cooperative or municipal utilities with very different motivations and decision-making processes from investor owned utilities like APS. APS would be the first large investor-owned utility to implement mandatory demand charges for all its residential customers.

Q. How many residential customers are subject to mandatory demand charges in the US?

A. Based on the data presented by Dr. Faruqui, there are currently only 65,000 residential customers on mandatory demand charges[17]. By requiring demand charges for its nearly 1.2 million residential customers, APS' proposal would be a 15-fold increase the number of electric customers in the US subject to mandatory demand charges.

Q. Are other large investor-owned utilities implementing mandatory demand charges?

A. No. Mandatory residential demand charges are not being embraced elsewhere in the US. For example, in Illinois ComEd similarly proposed legislation to impose a mandatory demand charge for all residential customers. Ultimately, this proposal

[16] Faruqui attachment AJF-2DR
[17] Ibid.

was struck from the bill after Governor Rauner's office stated that demand rates "are insane rates – and they should not be implemented".[18]

Q. Have utilities encountered difficulty implementing demand charges for residential customers?

A. Yes. For example, Glasgow Kentucky Electric Plant Board implemented mandatory demand charges for all residential customers in early 2016. This resulted in some customers experiencing bill increases up to 400%. In response, the Kentucky Attorney General requested the utility to establish an alternative so that customers could opt-out of the demand rate component, stating "Those that need our help the most are suffering… It is bad for the citizens of Glasgow. A better rate structure is feasible. It is doable."[19]

Q. APS has claimed that it has a high retention rate for its optional residential demand rate. Does RUCO believe this lends support to moving towards mandatory demand charges?

A. No. Opt-in success does not indicate all customers will understand or benefit from demand charges. Even if some APS customers have successfully opted-in to demand charges, this does not mean such success will extend to all customers. Other customers may not share the same level of sophistication or ability to respond as those that opted in.

[18] http://capitolfax.com/2016/11/21/rauner-administration-rejects-key-components-of-exeloncomed-bill/
[19] http://www.wbko.com/content/news/Attorney-General-stops-in-Glasgow-to-talk-EPB--396100461.html

Q. Does RUCO have other overarching concerns about mandatory demand charges for APS' residential customers?

A. Yes. Most of APS' customers this would reflect a radical new approach to computing electric bills. Of the >1 million residential customers served by APS, approximately 90% have no experience with demand charges. Since there are no examples to date of demand charges being required on such a large scale, it is unclear how the vast majority of APS customers will respond. RUCO is concerned that this change, as reflected in the proposed rates, will be detrimental to a high percentage of customers and may not even help to accomplish the desired outcomes (e.g. reduced peak demand).

Q. Is there much empirical evidence on how residential customers respond to demand charges?

A. No. A recent Rocky Mountain Institute report concludes "Well-designed demand charge rates may result in beneficial outcomes, but there is limited empirical evidence and most arguments remain speculative"[20]. This finding is backed up by LBNL's research scientist Peter Cappers.[21] RUCO believes that the adoption of mandatory demand charges for residential customers requires a substantially greater degree of evidence than what has been accumulated to date -- both by the Company and by the industry at large.

[20] RMI, A Review of Alternative Rate Designs, May, 2016
https://rmi.org/Content/Files/alternative_rate_designs.pdf
[21] MN PUC - Alternative Rate Design Stakeholder Meeting #2 November 4, 2016

Q. Does RUCO believe demand charges could potentially lead to hardship for certain customers?

A. Yes. While demand charges work for certain customers, RUCO believes there are many who lack the flexibility to manage their demand. Consider a single mom working two shifts to support her children. In between shifts she may only have a short window of time to prepare a meal, do the laundry, and other housework. Several appliances must be run at once within a small window of time, leading to unavoidable spikes in demand. Given the lack of flexibility and technology (e.g. no rooftop solar or demand control devices) for certain customers, RUCO believes demand charges are better left as a key offering in a suite of optional rate plans.

Q. Do customers have sufficient tools to address demand rather than energy savings?

A. Not necessarily. Most residential energy saving measures in the market today primarily focus on kWh energy savings. While many of these also yield demand savings, the primary focus is reduced energy kWh consumption. Any implementation of mandatory demand charges must be accompanied by a comprehensive portfolio of customer-focused demand saving options. While the Company's proposal has begun to identify some ways customers could theoretically reduce demand, RUCO believes the proposal falls short of providing a comprehensive portfolio of options. For example, APS has developed a smartphone app to provide customers with more information about their energy use. However, RUCO notes that only 1% of APS customers have both downloaded

and signed in to the app[22]. Thus, there is no indication that information technologies, like apps, are poised to be effective tools for aiding *all* residential customers at reducing their demand.

Q. Does RUCO have concerns about the design of the proposed demand charge?

A. Yes. There are many ways to design demand charges and a wide range of potential impacts each design could have on customer bills and the ability for customers to manage them. RUCO is not convinced that APS' proposal is designed in a manner that is conducive to customers achieving meaningful bill reductions via demand. For example, the fact that a large portion of demand charge revenue is collected in winter and shoulder months is concerning since customers will have fewer options to reduce demand during these periods of low consumption. Meanwhile, this does not necessarily align with APS' peak period. During these times of year, RUCO believes the demand charge begins to approximate a fixed charge.

Q. What customer behavior should demand charges encourage?

A. Demand rates should encourage customers to reduce their demand during peak times and season. APS is a summer-peaking system in which winter peaks do not contribute to the cost to meet peak demand. A properly designed demand rate will target peak hours during summer.

[22] APS response to AURA 1.3

Q. Has APS studied how some of its customers have responded to demand charges?

A. Yes. APS' studied a group of 1,000 customers from 2012-2014 who switched from time-of-use energy rates to three-part time-of-use demand rates[23].

Q. Does RUCO believe is indicative of its larger customer base?

A. No, RUCO does not believe so. While RUCO acknowledges that APS' study potentially illustrates some degree of response from customers who opted into demand rates, RUCO does not believe this constitutes evidence to suggest the average residential customer can understand or successfully manage demand. Furthermore, it does not suggest that demand charges are appropriate as the default rate option.

There are several key factors to consider. First, the study only looked at customers switching from time-of-use rates, which is not APS' default rate plan. Thus, this study is not useful for considering how customers on the default rate may respond to the introduction of demand charges. Second, customers previously on time-of-use rates will likely have some familiarity with time-varying pricing already. Thus it's still unclear how customers on non-time-of-use rates would respond to demand charges. In RUCO's opinion, a more appropriate interim step would be to move towards time-of-use rates, rather than mandatory three-part rates.

[23] Direct Testimony of Mr. Miessner at page 20

Q. Has the Commission approved residential rate options with demand charges in the past?

A. Yes. APS has a voluntary residential rate option that includes demand charges.

Q. What was the purpose of approving these residential demand charges?

A. As APS explains in its testimony, "The Commission further recognized that including a demand component in the residential customers' bills would provide 'an incentive to customers to manage their electric load in a manner that can result in lower electric bills for the individual customers and equally important, a reduction in APS peak demand which can have the effect of reducing the need for expensive additional generating facilities.'[24]". In other words, the Commission intended this rate option as a way to encourage customers to reduce their contribution to APS' peak demand.

Q. Does APS' proposal to impose demand charges on nearly all residential customers help to accomplish the goal of reducing peak demand?

A. No. In fact, APS' proposal does the exact opposite. It rewards customers with higher energy use and peak demand, penalizes customers with lower energy use and peak demand, and substantially increases costs for all customers during off-peak times. These outcomes are counterproductive to the supposed goals of the demand charge.

[24] Ibid. page 19

Q. Please explain how APS' proposed rates rewards customers with higher summer peak demand.

A. APS proposes to shift all residential customers to one of four new rate schedules: R-XS, R-1, R-2, or R-3. At present, most of APS' residential customers (~500,000) are currently on the default rate schedule (E-12). Under APS' proposal, the customers on the default rate with the highest levels of consumption and peak demand would experience a significant summer bill reduction. Meanwhile, the average and lower-use customers would experience a significant summer bill increase. The chart below illustrates the bill impacts to customers currently on the default rate.

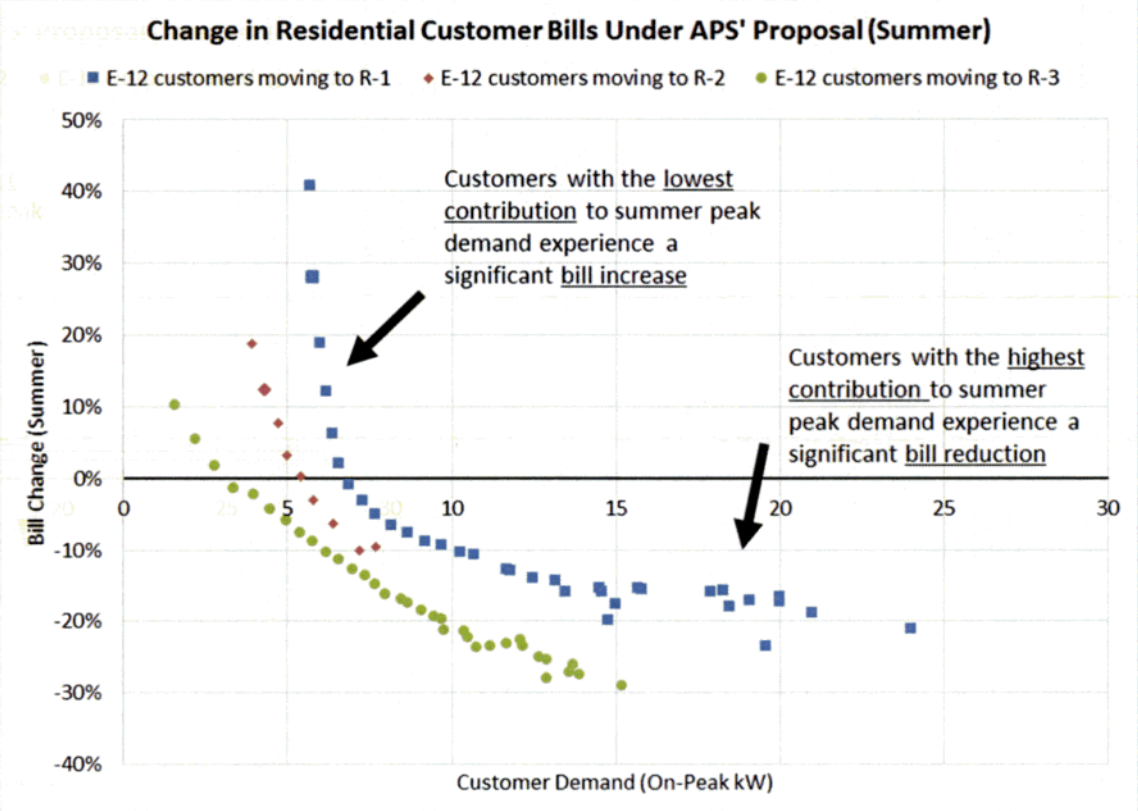

Figure 2

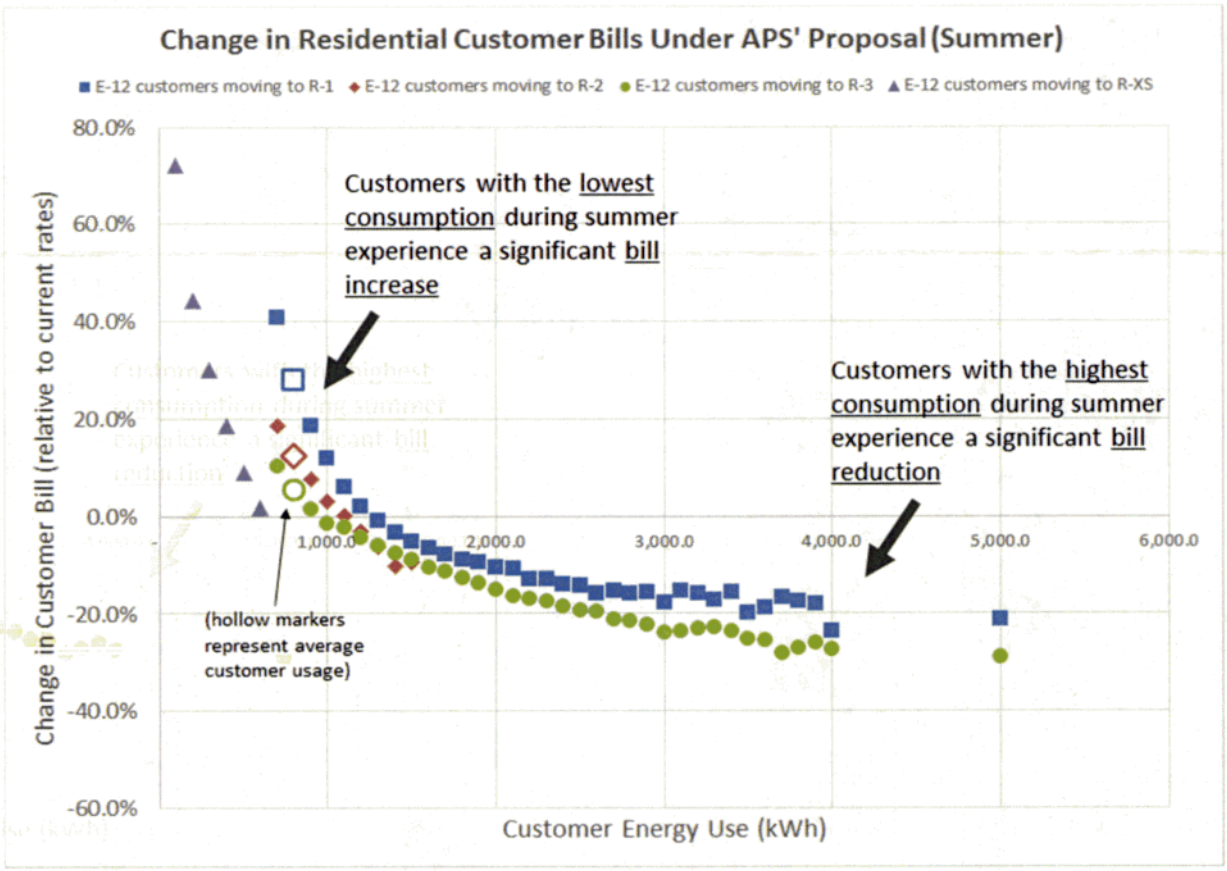

Figure 3

Q. Can you provide a specific example of the impact on a high-use customer?

A. Yes. Suppose for example that a higher-use E-12 customer (e.g. >1,300 kWh and >7.2 kW in summer) were placed on the proposed R-2 rate. This customer could experience an immediate 10% bill reduction during the summer months. As a result, this customer would then be able to increase peak demand by over 40% without seeing any bill increase relative to current rates. According to APS Schedule H-5, this group of high-using customers (i.e. with consumption >1,300 kWh per month during summer) accounts for >37% of all E-12 energy consumption

in the summer, but only represent 14% of total customers. Thus, APS' proposal effectively allows a small group of high-demand customers to increase their energy consumption and summer peak demand without paying any penalty.

Q. What impact would the proposal have on lower-use customers?

A. According to Schedule H-4, p 17, an E-12 customer who consumes below the average level (e.g. 700 kWh per bill in the summer) and is placed on the R-2 rate could experience an immediate bill increase of 19% in summer months. In order to offset this bill increase, the customer would need to achieve a reduction in peak demand of nearly 60%. In RUCO's opinion this would be very difficult to achieve since lower-use customers have fewer opportunities to reduce peak demand than higher-use customers.

Q. How does this compare to the demand savings APS customers on demand rates have achieved?

A. APS states that customers on three-part rates have saved on average about 3-4% on demand[25]. This is vastly different from the 60% reduction low use customers would need to achieve to offset their bill increase. It is also very small compared to the potential 40% demand increase that the proposal would enable for high-use customers without seeing a bill increase.

[25] Ibid. page 20

Q. How does APS' proposal increase costs for all customers during off peak times?

A. According to Schedule H-4, all customers on the default rate (E-12), even high-use customers would experience significant bill increases during the winter months. This is in part because the proposed demand charge would continue to apply during all months of the year including winter. For example, a customer consuming at 700 kWh month would experience a 52% bill increase in winter months. Offsetting this increase through demand charges would require a reduction in the customer's peak demand greater than 100% (i.e. it is not feasible).

Q. Is it appropriate to apply a demand charge in the winter?

A. No. APS' system peaks in the summer, not in the winter. Thus, it does not make sense to apply a demand charge that applies equally every day of the year. Moreover, the proposed rates are illogical in the sense that they would increase customer bills in the winter time, while reducing them for many customers in the summer. This sends a signal to customers that they should decrease usage during off-peak months (i.e. winter), but increase it during on-peak months (i.e. summer).

Q. What does RUCO conclude from this analysis?

A. The proposed rate design does not effectively promote or incent customers to reduce energy or peak demand. It exacerbates the problem by allowing the largest consumers to increase their energy usage and peak demand without any additional cost. Meanwhile, it penalizing those who consume less energy overall

and penalizes consumption that occurs during non-peak seasons when the contribution to system costs is much lower.

Q. How does APS believe its proposed rate reforms contribute to long term objectives?

A. As APS explains in its testimony, the proposed changes are "consistent with APS' Long Range Rate Plan" which "envisions a future where homes and businesses are effective resources for providing future power needs and reducing the need for additional central station power plants and other grid investments."[26]

Q. Does RUCO support APS' stated objective of reducing the need for central station power plants and other grid investments?

A. Yes. These are major cost drivers for all ratepayers and RUCO supports efforts to reduce these costs.

Q. What role do rates play in contributing to this objective?

A. As APS explains, "To make this work, APS must provide effective prices that both reflect cost and incent the right technologies - those that provide flexibility for APS generation requirements and are most effective in reducing APS summer peak demand, which drives so much of the Company's grid costs.".[27] In other words, rates should be designed to encourage the adoption of technologies and behaviors

[26] Ibid. page 6
[27] Ibid.

that can help to reduce grid costs, such as those driven by APS' summer peak demand.

Q. Does RUCO believe APS' proposed demand charges are needed to accomplish these objectives?

A. Not exclusively. RUCO believes that there are many tools that can be employed to accomplish these objectives.

Q. Has APS' current volumetric rate structure been effective at encouraging technologies and behaviors that reduce peak demand?

A. Yes. Significant peak demand reduction has been effectively achieved under APS current volumetric rate structure. This is illustrated in the chart below which plots APS' actual peak demand over time (orange dashed line) compared to where it would have been without peak reduction activities (solid blue line)[28]. As the chart shows, customer adoption of energy efficiency (EE) and distributed generation (DG) technologies in recent years have reduced peak demand by 700-800 MW. As a result, APS' peak demand has been flat to declining over the last decade (0% increase since 2008). Regarding DG, RUCO acknowledges that these savings may not persist over time and there could be significant diminishing returns in the ability of solar DG to reduce future peak demand.

[28] APS Stakeholder Meeting, November 18, 2016

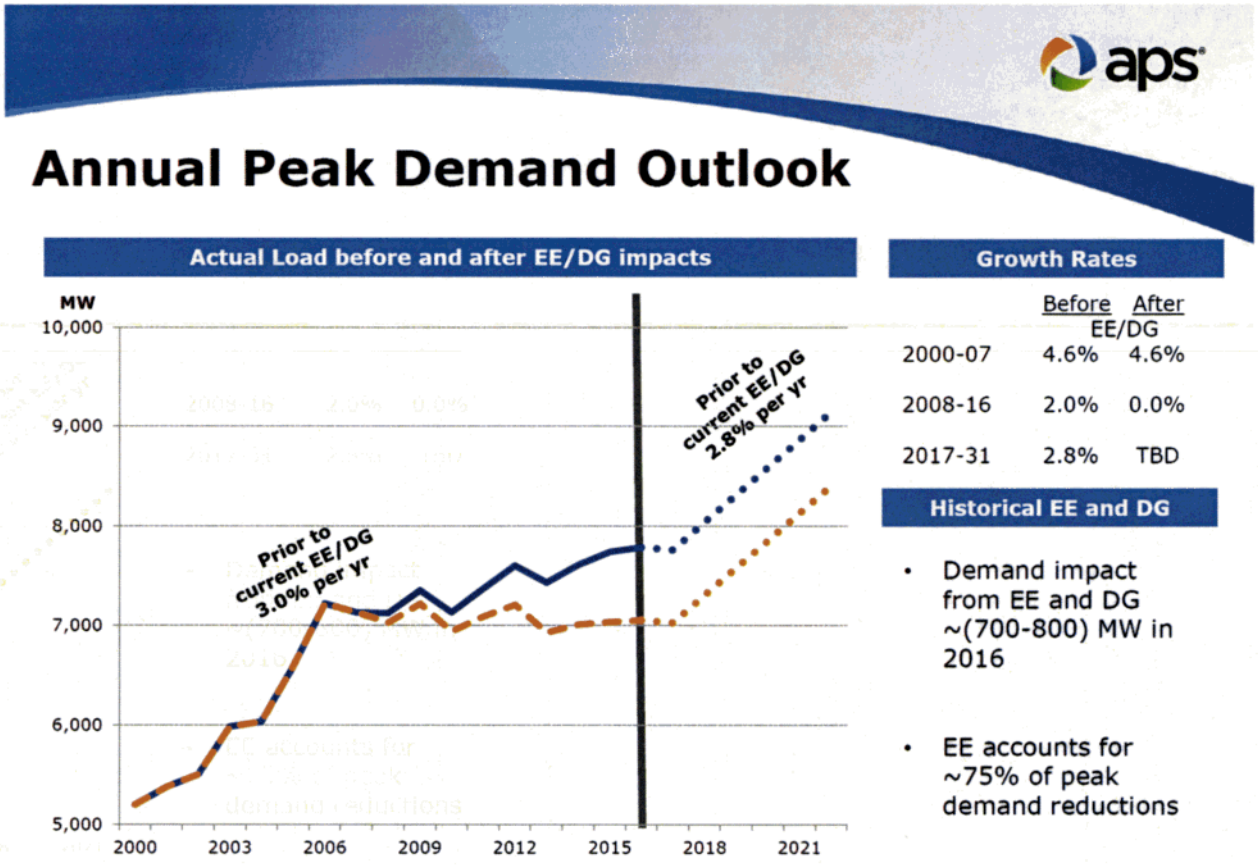

Figure 4

Q. Does RUCO believe peak demand has been a driver of system costs since APS' last rate case?

A. No. As indicated, peak demand has been flat in recent years.

Q. Is it possible that peak demand could rise in the coming years?

A. It is very possible. APS has forecasted increases to peak demand in future years. This concerns RUCO as this would be a major cost driver for ratepayer if it materializes.

Q. Does RUCO see a need to implement radical changes in residential rate design (such as the introduction of mandatory demand charges) to help address rising peak demand?

A. No. But concrete steps should be taken to address peak demand in advance of it becoming a problem. To the extent that rate design can help to limit future increases in peak demand, RUCO supports a more gradual approach to reforming residential rates that still targets peak times but does not include mandatory demand charges.

Q. Please describe RUCO's preferred approach to rate design to target peak times.

A. RUCO supports the introduction of two-part volumetric time-of-use rate options as the core offerings for residential customers. This approach better reflects the principles of rate gradualism by maintaining the volumetric rate structure that most customers are familiar with. However, it also creates an appropriate incentive for customers to adopt technologies and behaviors that can help reduce consumption during peak hours, thereby reducing system costs.

Q. How would this rate option be structured?

A. RUCO is open to ideas on how to structure the rate, but in general favors a narrow peak window (e.g. 3 to 5 hours) that is similar to what APS has proposed for its time differential rate components. RUCO recognizes that APS has changed their peak window from 7 to 5 hours and has more closely aligned it with the actual

system peak. RUCO is very supportive of this change. RUCO also believes the on-peak period should be aligned with historical peak load times while keeping an eye on the future. The chart below shows where the peak retail load hours for APS have fallen over the last 6 years (Figure 5). Based on this information a peak window in the range of 2-7pm appears sensible. Since the peak is moving later in the day (Figure 6), 3-8 PM may also be justified, as rates that are set today are held static until the conclusion of the next rate case.

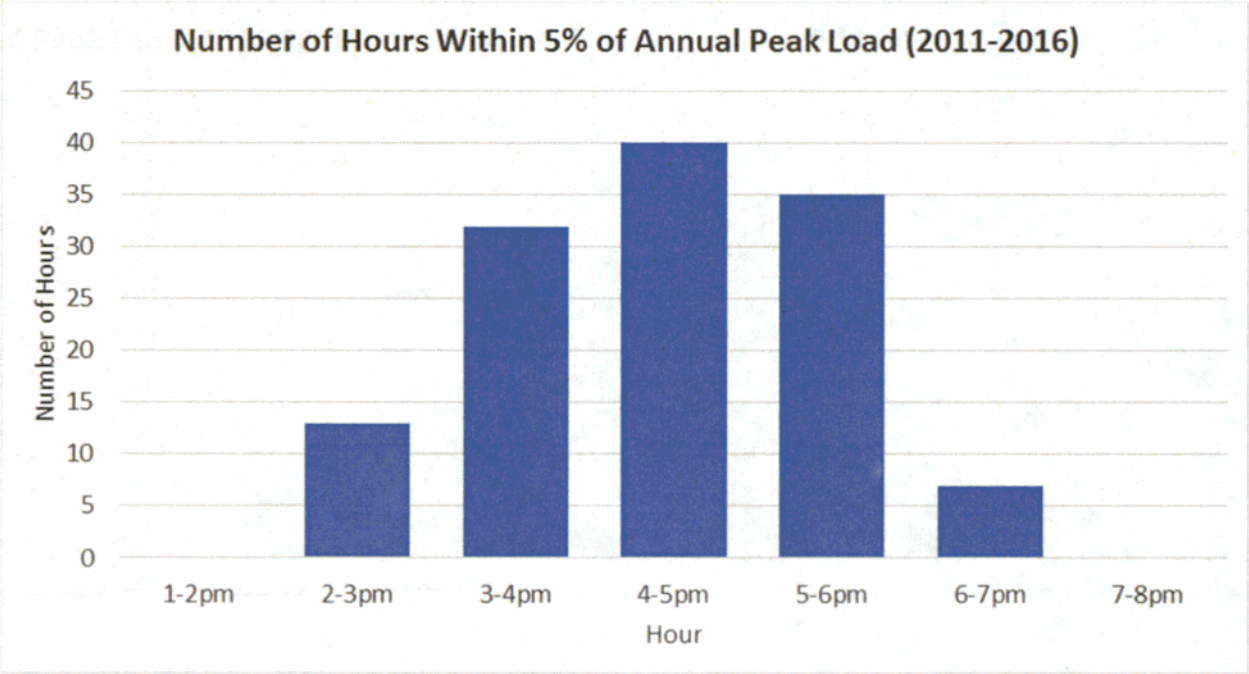

Figure 5

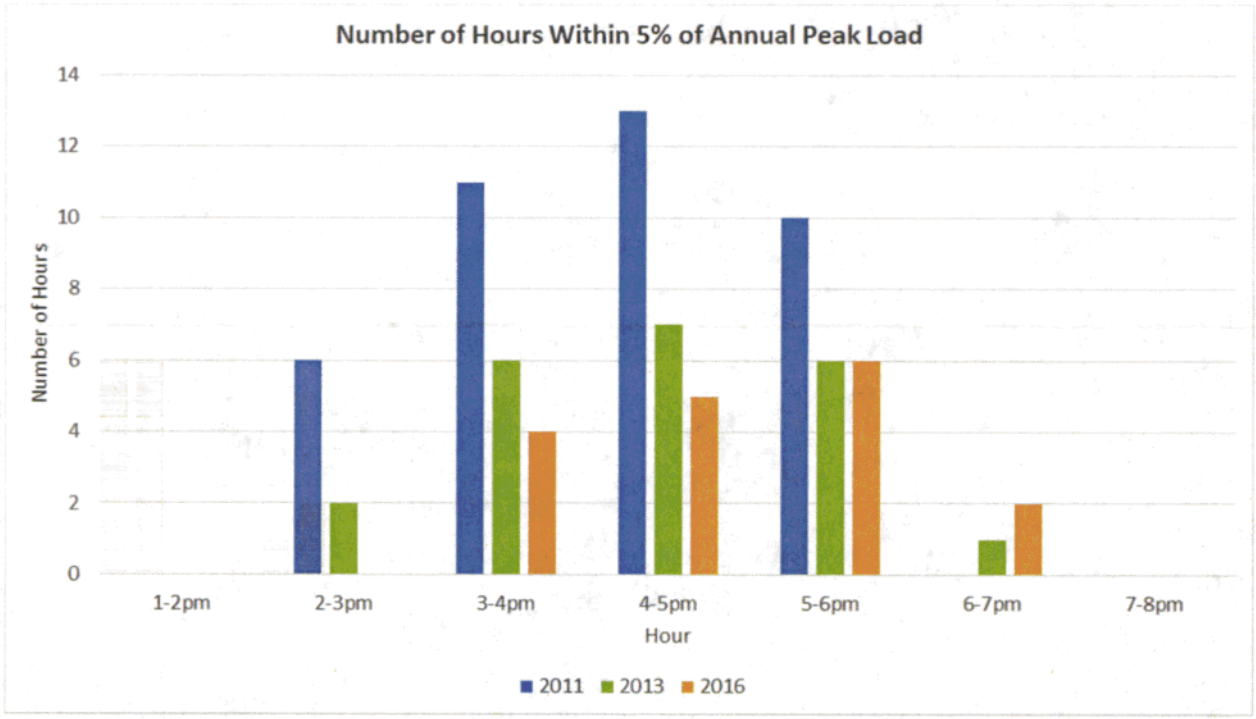

Figure 6

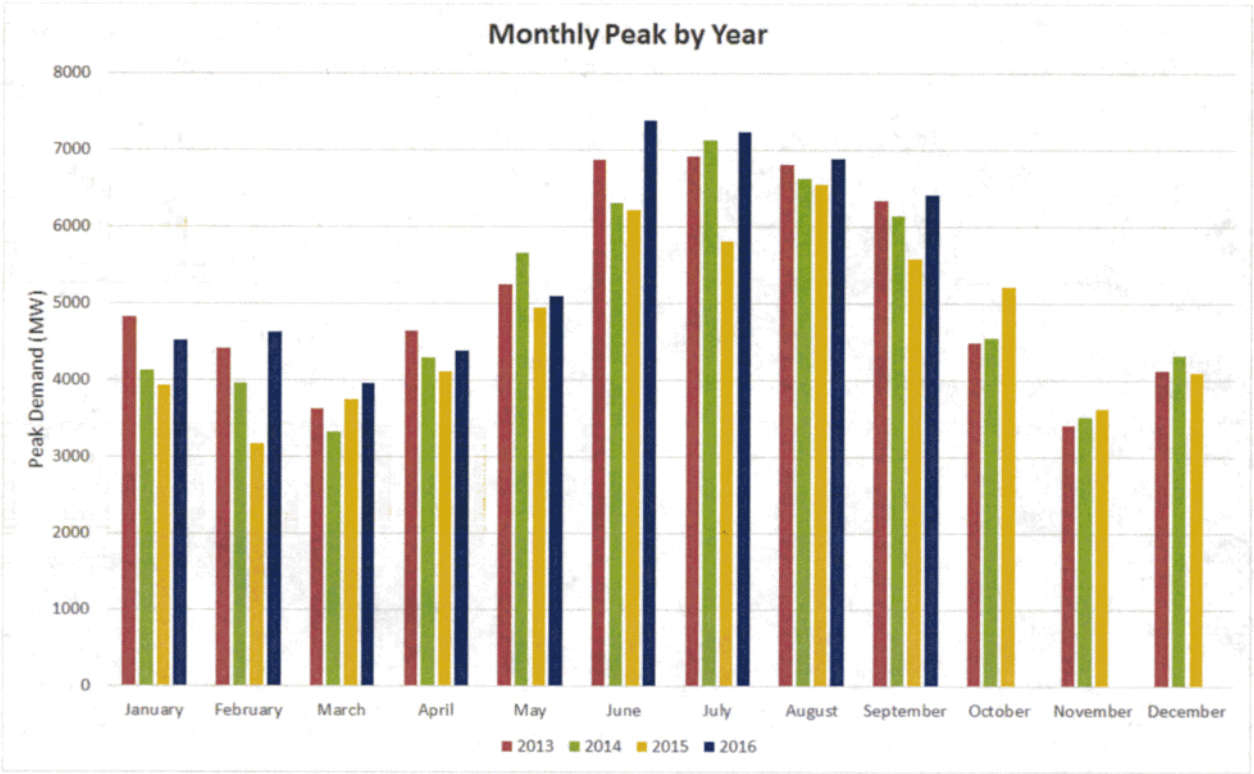

Figure 7

Additionally, there should be enough of a differential between on and off-peak hours to drive customer behavior.

Ideally, rates would have a different set of peak hours for winter and summer. Also having some shoulder months, like October and May might be prudent. However, this adds complexity and may not be advisable given the numerous other rate changes and the importance of customer comprehension. For simplicity RUCO sees justification in designating months May to through October as summer months with all other months being labeled as winter.

Q. Would RUCO support other rate design options?

A. Yes. RUCO supports other options that customers could opt into, including three part rates, a "super peak and off peak" TOU rate, and an optional two-part non-TOU rate for customers under 600 kWh in monthly usage.

Q. In addition to rate design, what steps could APS and the Commission take to address potential future increases in peak demand that may drive system costs?

A. First and foremost, APS should continue to implement the successful programs and policies that have helped to reduce peak demand. For example, the Company's DSM programs have contributed over 600 MW of peak demand reduction since their inception. RUCO anticipates that these programs will continue to play an important and valuable role in limiting system costs going

forward. Moreover, APS should strive to ensure that the programs being implemented are as cost-effective as possible. This is likely to result in programs that are also effective at peak demand reduction. However, even after accounting for existing programs and policies, APS still forecasts future increases in peak demand. While RUCO is unsure if and when these increases may materialize, the Commission could establish an additional peak demand reduction target for APS as a potential safeguard.

Q. Does RUCO have a suggestion in terms of a peak demand reduction target?

A. Yes, according to APS, peak demand (net of EE and DG) is expected to increase by 1110 MW by 2025[29]. RUCO proposes a commitment to reduce that figure by 75% or 833 MW. The chart below illustrates how this peak reduction target could fit into APS' overall portfolio of resources for meeting peak demand.

[29] APS response to RUCO 6.24

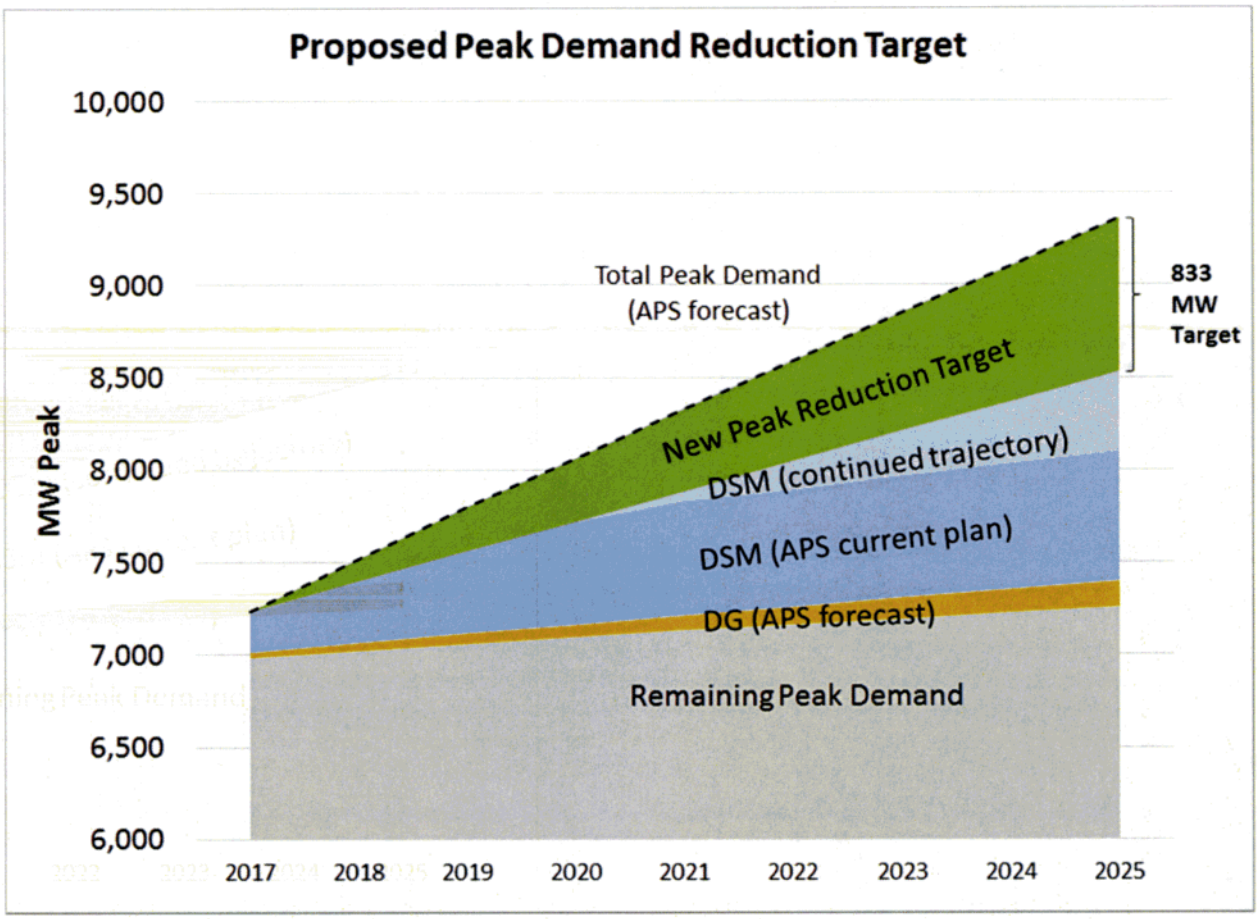

Figure 8

c. RUCO's Preferred Alternative: Default Time-of-Use Rates for Residential Customers

Q. What is RUCO's recommendation regarding APS' proposed rate design for standard residential customers?

A. For reasons described in my testimony above, RUCO does not support APS' proposal. RUCO believes the Basic Service Charge is excessively high. Additionally, RUCO does not believe it is appropriate to adopt mandatory demand charges for residential customers at this time. However, RUCO does support differential treatment of low-use customers (<600 kWh per month) for public policy reasons.

Q. What does RUCO recommend as an alternative to APS' proposal?

A. RUCO recommends a set of TOU rates for traditional customers with over 600 kWh of usage per month. To date, APS has shown tremendous success with customer adoption of TOU rates, with over 40% of residential customers on the ET-1 and ET-2 rate options[30]. Rather than move in a radically different direction by introducing mandatory demand charges, RUCO believes APS can build upon its success to date with TOU and begin to transition fully to time-varying volumetric rates. This transition would include a robust migration plan, education campaign, and set of empowerment tools. RUCO believes the time is right for this transition. This is especially true as Arizona faces a potential future with lower mid-day wholesale prices but high system costs during peak times. Finally, these rates will encourage customers to adopt new technologies and energy efficiency measures that save both the adopting customer and the general system money.

Q. Please describe these rate options in more detail.

A. RUCO believes that a sensible, fully volumetric, two-part TOU rate option should be constructed to serve as the new default residential rate for APS customers. This rate would have a moderate off-peak to on-peak price differential, and a narrow on-peak time window (e.g. 3 to 5 hours). It could also include two tiers of pricing based on total kWh usage. As an additional optional rate, RUCO proposes a fully volumetric rate with "super peak" time-of-use pricing that incorporates high on-peak volumetric rates and very low (near wholesale) off-peak rates. This optional

[30] APS Response to RUCO 7.2

rate would be intended for more sophisticated customers who are able to more actively manage their usage or adopt certain technologies like electric vehicles. Each of these rates could be accompanied by an optional variant that includes demand charges. A list of RUCO's recommended rate options for residential customers is provided below:

Recommended Rate Options for Residential Customers	**Applicability**	**Details**
2-part TOU	Default for customers >600 kWh	On-peak hours of 3 p.m. to 8 p.m. weekdays, excluding designated holidays, for both winter and summer (May-Oct) seasons.
2-part non-TOU rate	Default for customers <600 kWh	Flat volumetric rate; slightly higher Basic Service Charge
2-part TOU super-peak and off peak	Optional	On-peak hours of 3 p.m. to 8 p.m. weekdays, excluding designated holidays, for both winter and summer (May-Oct) seasons.
3-part TOU	Optional, customers currently on three-part rates would be transitioned to this	On-peak hours of 4 p.m. to 8 p.m. weekdays, excluding designated holidays, for both winter and summer (May-Oct) seasons.
3-part TOU super-peak	Optional	On-peak hours to 4 p.m. to 8 p.m. weekdays, excluding designated holidays, for both winter and summer (May-Oct) seasons.

Q. What does RUCO recommend for the basic service charge for these rate options?

A. In all cases, RUCO recommends a basic service charge for residential customers between $8 to $10/month. RUCO would be open to charging customers on non-TOU rates a higher basic service charge than those on TOU rates. If a higher BSC were adopted, RUCO stipulates that this would not reflect any differences in the economics for serving an individual customer. Instead, this be solely based on a policy decision by the Commission to create an incentive for customers to move towards the TOU rates.

Q. Has RUCO designed any of these rates yet?

A. Only preliminarily. RUCO intends to file specific rate options in the next round of testimony.

Q. Would DG customers be eligible for these rates?

A. No.

Q. How would customers transition to these new rates?

A. Customers on the current default rate (E-12) and TOU rates (ET-1 & ET-2) would transition to the new default TOU rate. Customers currently on three-part rates (ECT-1 and ECT-2) would be transitioned to the three-part variant. For current TOU customers this would largely be seen as a simple update in the peak time

frame. No customers would automatically transition to the super-peak rate and they would need to elect this option voluntarily.

Q. Has RUCO considered freezing the current E-12 rate instead of eliminating it?

A. Yes, however, RUCO would like to start eliminating frozen and legacy rates, especially those that do not send accurate price signals. Retaining a very large group of customers on a legacy rate will make the transition to smarter rate plans, like TOU rates, much slower and confusing.

Q. Does RUCO recommend any changes to the LFCR for standard residential customers?

A. No.

d. Transition to new rate design

i. APS proposed transition plan

Q. Other than rate design, are there other critical issues that must be addressed in tandem with comprehensive rate reform?

A. Yes. Perhaps the next most important issue is establishing a fair plan for migrating customers from the current set of rates to the new rates. Of upmost importance in this plan is the treatment of the plurality of residential customers on the default rate option (in APS' case this is the E-12 inclining block rate).

Q. Please summarize the Company's proposed transition plan.

A. APS proposes to analyze customers' prior year usage and select a rate plan that is best for the customer. Customers will receive an initial letter explaining that this analysis has been done, what their new rate plan will be, the effective date of the new rate, and tips to manage demand before migration. The initial letter will be followed by a bill insert or email reminding them of the new rate. No customers will be migrated during peak summer months[31].

Q. How does APS define 'best rate plan'?

A. APS indicates that they will migrate customers to the rate plan that results in the lowest annual bill[32].

Q. Please summarize how APS plans to inform customers of the transition.

A. The Company also proposes to conduct education and outreach through social media, mass media, smart video, phone, email, and a personalized Welcome Kit. APS has also committed to conduct community outreach through organizations, town halls, homeowner associations and similar groups.

Q. Does RUCO support these efforts?

A. Yes. RUCO strongly believes education and outreach are key to successful implementation and appreciates APS' efforts to provide this.

[31] Direct Testimony of Ms. Derstine at pages 16 - 17
[32] APS response to RUCO 7.11

ii. RUCO's recommendations

Q. Why is it especially important to consider customers on the default rate?

A. There are two main reasons: 1) This constitutes the largest single group of residential customers. 2) While many APS customers have switched to other rate options, this group has not. Thus there is reason to believe many of them may not choose a different rate option than what is assigned to them by default, despite any education and outreach efforts that might be attempted.

Q. If the default inclining block rate (E-12) is eliminated as the default rate, what does RUCO recommend for the new default rate?

A. As explained above, RUCO recommends a uniform application of TOU rate options for customers above 600 kWh in monthly usage. The default rate would be a two-part, volumetric time-of-day rate.

Q. Does RUCO support any aspects of APS' proposed transition plan?

A. Yes. In particular RUCO supports APS' proposal to avoid migration during summer peak months to avoid any potential rate shock associated with higher TOU on-peak prices in the summer months. Additionally, RUCO supports APS' plan to analyze the customer's prior year usage and determine which new rate plan is best for them. However, RUCO believes APS should do more than simply explain that the Company has done an analysis. APS should share this analysis with the customer well in advance of migration. At least 3-6 months prior to migrating customers to a new rate, APS should provide information to the customer through

both a customized letter and APS' online account platform that provide details of the analysis. This should include information on what each month's bill will be going forward under each of the new rate options, assuming similar usage patterns. Below is an example of how the analysis could be presented.

	Current Rate	New Rate (default)	Alternative Rate Option 1	Alternative Rate Option 2
Jan	$115	$105	$125	$95
Feb	$113	$103	$123	$93
Mar	$117	$107	$127	$97
...	...	...	...	...
Total	$1450	$1312	$1621	$1254

Q. Does RUCO have any recommended best practices for implementing rate design changes?

A. A. Yes. Below I address a few best practices that RUCO supports and discuss how they are addressed by the Company's proposal and how the proposal could be improved:

Customer transition should have additional transitional elements. In its testimony, the Company proposes a transition period of 9 - 12 months in which the Company migrates blocks of customers to new rates based on their billing date. RUCO appreciates APS' proposed outreach campaign to educate customers about the new rates during the transition period. However, for some customers this may not constitute a meaningful transition from their perspective. Even a comprehensive education and outreach plan may not necessarily reach all customers. Thus, in

addition to the proposed outreach plan and transition letter, RUCO recommends APS utilize a shadow billing for 3-6 months as described above. This allows the customer sufficient time to modify their usage patterns, or opt for a different rate plan before the new rate is implemented. In addition to shadow billing, the Company could consider phasing in the new rates in a stepwise manner to avoid any large bill increases. Finally, once customers have moved to the new rates, RUCO supports APS' commitment to provide sustained education and outreach after the transition period to ensure customers understand how the new rate elements are affecting their bills.

The Company should ensure customers understand any new default rate. The Company's transition plan makes mention of many educational efforts around the new rate plans, however, it falls short of verifying that customers truly do understand their new rate plan. To ensure that the education effort is taken seriously and is meeting its objectives, RUCO recommends that APS commit to a sustained effort to study customer comprehension of how new rate elements are affecting their bills. This could be done through customer surveys and focus groups, with findings periodically reported to the Commission.

Customers should be able to opt-out of their default rate. RUCO supports the Company's proposal to allow customers to move to any of the available rate plans before or after their migration.

Any time of use rate should have short peak duration and meaningful rate differentials. RUCO believes that residential customers should not be asked to manage their load for large periods of the day. RUCO believes APS' proposed peak duration of 5 hours is reasonable, and would even consider a shorter time window (e.g. 3 or 4 hours). To encourage shifting behavior, the differential between on-peak and off-peak rates should be meaningful.

Q. On the whole, does RUCO believe the Company has proposed a thoughtful and effective transition plan?

A. As explained in testimony above, RUCO supports several key elements of the plan. However, RUCO believes that additional improvements to the transition plan could help to make it more effective. Some of these were discussed above. In addition, the Company's witness, Dr. Faruqui has previously provided a thorough workflow for transitions to new rates (Figure 9).

RUCO believes the Company has included some, but not all, of these critical elements addressed by Dr. Faruqui. For example, RUCO believes the Company could do more to address the categories of formulating objectives, conservation impacts, costs and benefits, and protection for vulnerable customers.

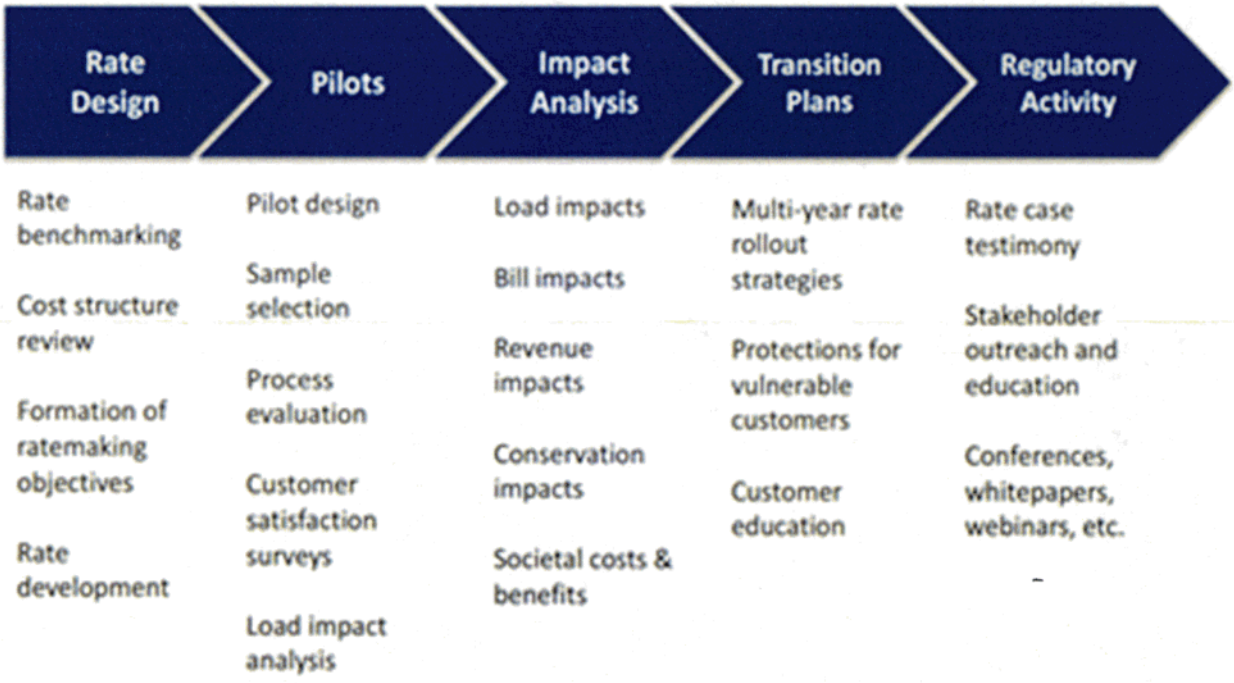

Figure 9[33]

Q. In addition to these issues, are there other actions Dr. Faruqui identifies that could help facilitate a transition?

A. Yes. In fact, Dr. Faruqui has outlined several actions that RUCO believes are worthy of consideration, some of which APS has already undertaken[34].

1. Codify and learn from the experience of utilities that have deployed new rates in the US and in Europe.
2. Quantify bill impacts, particularly for low and moderate income customers.
3. Assess customer understanding of the new rates through market research (interviews, focus groups and surveys) and identify the best way to communicate the concept and to design the rates.

[33] Residential Demand Charges: An Overview, presentation to EEI Rate Committee Meeting, March 2016, http://www.brattle.com/system/publications/pdfs/000/005/276/original/Residential_Demand_Charges_An_Overview.pdf?1458061233

[34] Ibid

4. Assess customer response to new rates through a new generation of experiments whose design builds on insights gleaned from prior work on time-of-use pricing experiments.
5. Study ways in which to mitigate financial impact on vulnerable customers, maybe by excluding them initially from the new rates, or by phasing in the rates, or by providing them financial assistance for installing energy efficiency measures.

Q. Are there items on this list that RUCO believes APS' transition plan could improve upon?

A. Yes. Regarding market research (#3), RUCO believes the Company's proposed education and outreach plans are primarily one-directional. While the Company has proposed to "monitor customer feedback regarding recent transition experience" it is not clear how this feedback will be used to make improvements as the transition progresses. Additionally, regarding #4, the Company could undertake additional studies or experiments to measure customer response to the newly adopted rates or potential future rates. Below I will describe RUCO's recommendations for one possible study.

Q. What other options might be considered as part of the transition plan?

A. While RUCO strongly opposes mandatory demand charges for residential customers, RUCO might support a limited, controlled study of demand charges that also includes consumer protections. This is in part because there is virtually

no information in general about how typical residential customers respond to demand charges if placed on a three-part rate by default (rather than opting in).

Q. How would such a study work?

A. As part of the transition to new rates, RUCO anticipates that a significant number of customers will be transitioned to the default rate option and not proactively select an alternative rate option. A small number (e.g. 5,000) of these customers, that do not proactively select an alternative, could form a study group. During a predefined study period, the study group would be transitioned to a rate option that includes a demand charge, instead of the default rate. These customers would still be able to switch to another rate plan at any time. At the conclusion of the study period, these customers would be placed back on the default rate. Furthermore, RUCO would want to ensure that these consumers are well-protected so that they are not being studied at a significant cost to them. Thus, at the conclusion of the study period these customers would automatically receive a refund if their bills would have been lower on the default rate option.

3. Rate design for partial requirements customers or advanced DG customers

Q. What is RUCO proposing for DG customers?

A. RUCO has always advocated and strongly believed in separate treatment for DG adopters. Above a certain load offset, RUCO believes DG adopters are partial requirements customers that should be treated separately but fairly. While acknowledging the false precision, RUCO proposes a partial requirements designation for any customer who installs electricity producing technology totaling more than 25% of their annual load. RUCO finds this reasonable. For the rest of this testimony the term "DG customers" and "partial requirements customers" will be synonymous.

Q. What rate structures does RUCO propose for DG customers?

A. RUCO is open to at least three different options:

1. A three part TOU rate with a cost of service based 8.9 cent/kWh blended volumetric offset rate for south facing fixed tilt solar. The export rate would be the prevailing RCP rate. The fixed charge would be the same as what is applied to standard customers. To obtain the RCP rate, instead of a lower wholesale rate, renewable energy credits would need to be exchanged.

2. A fully volumetric TOU option with a time differentiated export adjustment on the RCP value for any instantaneous exports to the grid. Again, the fixed charge would be the same as what is applied to standard customers.

3. An RPS credit option tied to REST compliance with capacity based step downs. A customer selecting this option could be on any underlying three part TOU rate plan available to standard customers. The "buy-all sell-all" like rate would be locked-in for 20 years. RUCO is open to starting the rate at RCP or an average of RCP rates. This option would be applied to all a system's production. Step downs would triggers as RECs from this option and the three part option are transferred to the utility. The details of the RPS credit option can be worked out in this rate case or in the Company's upcoming implementation plan. Depending on Party feedback, RUCO may put forth a potential design in the next round of testimony. RUCO is also considering an adder for peak hours. A summary of illustrative rate designs are below:

Peak – 3 pm – 8pm, summer: May – October

DG Demand		**DG Time of Use**	
Summer - Days	0.336	Summer - Days	0.336
On-peak kW	10.000	On-peak kW	-
On-peak kWh	0.16000	On-peak kWh	0.20000
Off-peak kWh	0.08000	Off-peak kWh	0.10000
Winter - Days	0.336	Winter - Days	0.336
On-peak kW	5.000	On-peak kW	-
On-peak kWh	0.14000	On-peak kWh	0.18000
Off-peak kWh	0.07000	Off-peak kWh	0.09000

Q. How did you arrive at the 8.9 cent/kwh cost of service rate?

A. I examined the cost of service study performed by APS covering solar adopters. The study displayed a quite significant drop in demand usage due to solar which I took into account when designing these rates.

Q. Can you speak a little more on your methodology?

A. Yes, using best available data, I took the revenue contribution of standard customers that could go solar, as a starting point. Ideally, I would have excluded those living in apartment buildings and those with very low usage but the data was unavailable so I defined "standard customers" as anyone above 600 kWh monthly usage as the criteria. I then broke down the total revenue figure into cost components and stripped out energy to arrive at the average contribution to fixed costs. Next, I discounted that figure to account for solar's reduction in demand. I used APS supplied credit rates in the "LRS_WP06DR 2015 Test Year Solar Credit Information" spreadsheet. I used all the same energy rate factors except I adjusted the production demand up from 28.8% to 46% to account for the fact that solar customers seemed to significantly reduce peak demand on the class and system peak day and time of August 15th at 5:00 PM. The end result of this, taking into account a 54% export rate on a PV system matching annual usage, is an 8.94 cent/kWh rate.

Q. Does this concern RUCO considering the cost of service approach is less than the starting RCP value?

A. Yes, having a rate with a lower self-consumption value and higher export rate encourages perverse behavior. First, a customer has incentive to turn off as much load as possible during peak solar hours and export their solar to the maximum extent. This uses the grid more, encourages larger systems, reduces mid-day load during shoulder months, and discourages technologies like energy storage.

Moreover, there is reason to argue that the RCP value of 11.5 cents/kWh is too high.

Q. Why would RUCO argue that the 11.5 cents is too high?

A. The 11.5 cent/kWh rate does not factor in 2016 data which would include APS' new Red Rock Solar Plant. This is likely because of the limitation in Decision No. 75859 of only including those projects completed through the end of the test year. RUCO understands that a Plan of Administration will be developed to outline the procedure for making yearly modifications. However, RUCO is concerned with the process of setting the compensation in the rate case based on nearly a year and a half old data. For instance, in this case, with a test year ending December 2015 and a compensation rate based on the RCP set sometime in the summer of 2017, nearly a year and a half will have passed with no update to the RCP.

Q. What would the RCP value be is Red Rock was included?

A. The rate would be around 9.66 cents/kWh. Much closer to the cost of service figure I mention earlier.

Q. Beyond advocating for inclusion of the Red Rock plant, what is RUCO's solution?

A. This is where the optional volumetric DG TOU rate comes into play. RUCO is proposing an adjustment to the prevailing RCP value based on time of day and season. Since this rate is optional, RUCO sees no issue with this structure.

Q. So exports on the DG TOU rate would get the RCP rate but with adjustments by time of day and season?

A. Yes, this solves the awkward price signal to export rather than self-consume and to reduce load during solar hours, instead of shifting load to cheap solar hours.

To ensure proper alignment the RCP would have a charge during off peak hours and an adder during on peak hours. RCP for off peak would be subject to a 70% reduction while on peak rates would be subject to a 150% adder.

Q. On the rates you designed, can solar adopters get more than 8.9 cents/kWh?

A. Yes, for instance on the DG TOU rate, if one deploys a west facing system, that orientation increases the value of the overall solar offset by nearly 2 cents/kWh. Moreover, if one load matches, meaning less PV system exports during off peak hours, they would receive a higher rate by avoiding the RCP adjustment charge. RUCO is also open to other adders and the option of having the RCP time of use adjustments offered on the three part rate.

Q. What other adders is RUCO open to exploring?

A. RUCO is open to adders based on beneficial inverter settings and access as well as curtailabilty.

Q. Could these all these rate and adder options be applicable to commercial customers?

A. Perhaps. RUCO is open to discussing that point, but in this testimony the focus has been exclusively residential.

Q. What about existing DG customers?

A. They would be grandfathered for 20 years. RUCO witness Radigan will be covering the details of this in his testimony.

4. Other policy considerations

Q. What does RUCO propose for the LFCR?

A. As mentioned, RUCO sees no reason to change the LFCR for standard customers. However, RUCO is open to adjustments for DG customers to aid in cost recovery.

Q. What recommendations does RUCO have to help ensure that future rate increases are minimized for APS customers?

A. RUCO believes there are several improvements that could be made to APS' Integrated Resource Planning (IRP) process that would help minimize future rate increases. These include:

- Increased assessment of the frequency and timing of low or negative mid-day wholesale prices
- Assessment of existing flexible capacity on APS' system and need for flexible capacity going forward

- Retrospective analysis of load and demand forecasts
- Retrospective analysis of technology cost forecasts
- Estimates on customer bill impacts depending on future scenarios
- Assessment of potential costs and benefits associated with coal retirements:
    - Analysis of replacement resource options
    - Analysis of reliability service needs (e.g. voltage support, frequency response, regulation and load following, local resource adequacy)
        - Should include assessment of possible alternatives for meeting those needs and their cost. Should include alternatives to natural gas-fired generation (e.g. static Var compensators, synchronous condensors, inverter-based generation technologies, energy storage, etc.)

Q. What are RUCO's concerns regarding APS' presentation of its Cost of Service Study (COSS) in this proceeding?

A. RUCO found the APS COSS to lack transparency and was not easy to interpret for stakeholders outside the company. Furthermore, RUCO found it difficult for APS to provide information and answers to basic data requests regarding the COSS information (such as standard FERC account cost information). RUCO recognizes that while the current COSS procedure is lacking and needs to evolve into a better tool, it is better than what it has been in the past. Going forward RUCO recommends that APS and all other Arizona utilities adhere to specific formats and criteria when providing COSS information. For example, specific costs recovered

through the BSC, and associated FERC accounts, should be specified in a table format similar to that provided in RUCO's testimony and reproduced as follows:

Cost Category	**FERC Account**	**Total Residential Revenue Requirement ($/customer/month)**
Metering	370	$--
Services	369	$--
...	...	...

Q. Is RUCO proposing other rates designs?

A. Yes, RUCO is proposing an experimental storage rate plan that attempts to send a very strong price signal during peak times. RUCO would like to see customer and industry response to such a rate and measure peak demand reduction. Due to the unknown response to such a rate RUCO proposes limiting the rate to 10,000 customers. This would be a soft cap, meaning APS could always expand the number without a Commission Order.

Q. Does RUCO have a preliminary design of the rate?

A. Yes, please see below:

Peak – 3 pm – 8pm, summer: May – October

Rate Experimental Storage	1-hour interval
Summer - Days	0.336
On-peak kW	20.000
On-peak kWh	0.10000
Off-peak kWh	0.05000
Winter - Days	0.336
On-peak kW	16.000
On-peak kWh	0.08000
Off-peak kWh	0.04000

Q. What are some other benefits to this storage rate?

A. The pure demand based price signals reduce the need for large direct incentives for energy storage which makes the transaction much more straightforward. It also enables an easier cost benefit review of the rate. Lastly, the learning from this experimental rate will help shape rate design in the next case because we will be able to see what works and what doesn't work with the rate.

Q. Has RUCO reviewed the economics of the Company's Solar Partner Program (SPP)?

A. Yes, although final discovery questions on the matter are still outstanding. Therefore, RUCO is reserving conclusions until the next round of testimony.

Q. Does this conclude your testimony?

A. Yes, it does.

EXHIBIT LH-1

STRATEGEN CONSULTING

Lon Huber
Director

Experience

Director March 2015 – Present
Strategen Consulting – Berkeley, CA
Strategen is a strategic consulting firm that develops tailored solutions for a diversity of clients - empowering them with the insight they need to create sustainable value for their investors, customers, and ratepayers.

- Responsible for Strategen's fast growing public sector consulting practice.
- Frequently cited in trade press and a regular speaker at NARUC and NASUCA conferences.

Consultant and Special Project's Advisor to the Director April 2013 – March 2015
Arizona's Residential Utility Consumer Office (RUCO)

- Responsibilities: policy analysis and design, advocacy, case testimony, constituent outreach, and financial analysis.

Former Vice President and Advisor 2011 – 2015
Arbsource, Arizona

- Arbsource is a biotechnology startup that is developing a product to deliver fast, efficient, and modular wastewater treatment for the food & beverage processing industry.
- The company has garnered numerous awards including a federal SBIR grant and has obtained exclusive IP with Arizona State University.

Founder February 2010 – 2014
Next Phase Energy, Arizona

- Business provided project management, consulting, and financial modeling work.
- Partnered with DOE, Arizona Governor's office, and Tucson Electric Power on home energy management projects.

Manager September 2011 – December 2012
Suntech America, San Francisco

- Point person for the company in every key state solar market except California.
- Worked to balance cost effective utility-scale solar with state distributed generation policy goals.
- Elected by SEIA member companies to be the state lead in Arizona.

Finance Development Coordinator September 2010 – September 2011
TFS Solar – Tucson, AZ

- Created a solar financing program for faith based organizations in Tucson.
- Instrumental in forming the Southern Arizona Solar Standards Board.
    - The first organization in the country dedicated solely to consumer protection around distributed generation.

Policy Program Associate August 2007 – September 2010
Arizona Research Institute for Solar Energy at the University of Arizona

- Helped build the institute while gaining experience with the technical attributes and challenges of various energy technologies.

- Worked with the Greater Phoenix Economic Council on communicating a program to attract renewable energy manufacturers to Arizona. Published a white paper and policy brief for state legislators. A bill (SB 1403) based on this program was signed into law.
- Created and copyrighted PV Sim™, an online financial calculator for prospective residential PV system owners.

Congressional Fellow – D.C. January 2009 – May 2009

- Responsibilities included weekly memos to the Congress member on energy issues, forming energy related legislation (Solar Schools Act - H.R. 4967), and creating educational presentations on energy.

Education

Masters of Business Administration (MBA) January 2010 – May 2011
Eller College of Management - University of Arizona

Bachelor of Science - Public Policy and Management August 2005 – May 2009
School of Government & Public Policy - University of Arizona
Cumulative GPA: 4.00 - Honors - Summa Cum Laude
Dean's List with Highest Academic Distinction & Senior of the Year Award

Community Involvement

- Appointed to the Arizona Governor's Solar Task Force, 2013
- Chairman - Southern Arizona Regional Solar Partnership at the Pima Association of Governments, 2011
- Founding Chairman - University of Arizona Green Fund, 2010 to 2011
- Member of UA President's Campus Sustainability Advisory Board, 2008 to 2011
- Big Brother for a child in special needs program - Tucson Big Brothers Big Sisters, 2006 to 2008

Awards & Honors

- Arizona Daily Star's "40 Under 40" winner for leadership, community impact, and professional accomplishment
- University of Arizona Honors College Young Alumni Award Winner, 2011
- Outstanding Professional Staff Member – University of Arizona, 2010
- Arizona Foundation Outstanding Senior Award for the Eller College of Management, 2009
- Honors College Pillars of Excellence Award, March 2009
- Congressional Recognition Award, May 2008

EXHIBIT LH-2

THE NATIONAL ASSOCIATION OF STATE UTILITY CONSUMER ADVOCATES RESOLUTION 2015-1

OPPOSING GAS AND ELECTRIC UTILITY EFFORTS TO INCREASE DELIVERY SERVICE CUSTOMER CHARGES

Whereas, the National Association of State Utility Consumer Advocates ("NASUCA") has a long-standing interest in issues and policies that ensure access to least-cost gas and electric utility services, which are basic necessities of life in modern society; and

Whereas, in recent years, gas and electric utilities have sought to substantially increase the percentage of revenues recovered through the portion of the bill known as the customer charge, which does not change in relation to a residential customer's usage of utility service, through proposals to increase the customer charge or through the imposition of what have been called Straight Fixed Variable or SFV rates; and

Whereas, these gas and electric utilities have sought to justify such increases by arguing that all utility delivery costs are "fixed" and do not vary with the volume of energy supply delivered to customers, and that reductions in customer usage due to conservation and energy efficiency increase the risk of non-recovery of utility costs; and

Whereas, based on these arguments, these gas and electric utilities have proposed that a greater percentage of utility costs (distribution costs such as electric transformers and poles and natural gas mains, traditionally recovered through volumetric rates) should be collected from customers through flat, monthly customer charges; and

Whereas, gas and electric utilities' own embedded cost of service studies,[1] in fact, show that a substantial portion of utility delivery service costs are usage-related, and therefore, subject to variation based on customer usage of utility service; and

Whereas, increasing the fixed, customer charge through the imposition of SFV rates or other high customer charge structures creates disproportionate impacts on low-volume consumers within a rate class, such that the lowest users of gas and electric service shoulder the highest percentage of rate increases, and the highest users of utility service experience lower-than-average rate increases, and even rate decreases,[2] in some instances; and

Whereas, nationally recognized utility rate design principles call for the structuring of delivery service rates that are equitable, fair and cost-based; and

Whereas, SFV and other high customer charge rate design proposals, in which low-use customers would see greater than average increases, while high-use customers would experience lower-than-average increases and even decreases in their total distribution bill, are unjust and inconsistent with sound rate design principles; and

Whereas, data collected by the U.S. Energy Information Administration show that in a vast majority of regions called "reportable domains,"[3] low-income customers (with incomes at or below 150% of the federal poverty level) on average use less electricity than the statewide residential average and less than their higher-income counterparts;[4] and

Whereas, these data also show that in every reportable domain but one, elderly residential customers (65 years of age or older) use less electricity on average than the statewide residential average and less than their younger counterparts;[5] and

Whereas, these data also show that in a vast majority of reportable domains, minority (African American, Asian and Hispanic) utility customers on average use less electricity than the statewide residential average and less than their Caucasian counterparts;[6] and

Whereas, data from the U.S. Department of Energy's Residential Energy Consumption Survey for the Midwest Census region, show that natural gas consumption increases as income increases, and that higher incomes lead to occupation of larger sizes of housing units,[7] thereby increasing the likelihood of higher gas utility usage, and that natural gas usage increases as income increases in the vast majority of reportable domains throughout the U.S;[8] and

Whereas, given these documented usage patterns, the imposition of high customer charge or SFV rates unjustly shifts costs and disproportionately harms low-income, elderly, and minority ratepayers, in addition to low-users of gas and electric utility service in general; and

Whereas, because the imposition of high customer charge or SFV rates results in a smaller percentage of a customer's utility bill consisting of variable usage charges, customers' incentive to engage in conservation as well as federal and state energy efficiency programs is significantly reduced; and

Whereas, NASUCA supports the adoption of cost-effective energy efficiency programs as a means to reduce customer utility bills, help mitigate the need for new utility infrastructure, and provide important environmental benefits; and

Whereas, given that the imposition of high customer charge or SFV rates means that a smaller percentage of a customer's utility bill is derived from variable usage charges, the imposition of SFV-type rates reduces the ability of utility customers to manage and control the size of their utility bills;

Now, therefore, be it resolved, that NASUCA continues its long tradition of support for the universal provision of least-cost, essential residential gas and electric service for all customers;

Be it further resolved, that NASUCA *opposes* proposals by utility companies that seek to increase the percentage of revenues recovered through the flat, monthly customer charges on residential customer utility bills and the imposition of SFV rates;

Be it further resolved, that NASUCA urges state public service commissions to reject gas and electric utility rate design proposals that seek to substantially increase the percentage of revenues recovered through the flat, monthly customer charges on residential customer utility bills – proposals that disproportionately and inequitably increase the rates of low usage customers, a group that often includes low-income, elderly and minority customers, throughout the United States;

Be it further resolved, that state public service commissions should promote and adopt gas and electric rate design policy that minimizes monthly customer charges of residential gas and electric utility customers in order to ensure that delivery service rates are equitable, cost-based, least-cost, and encourage customer adoption of conservation and federal and state energy efficiency programs.

Be it further resolved that NASUCA authorizes its Executive Committee to develop specific positions and to take appropriate actions consistent with the terms of this resolution.

Submitted by Consumer Protection Committee

Approved June 9, 2015
Philadelphia, Pennsylvania

No Vote: Wyoming
Abstention: Vermont

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[1]*See, e.g.,* Illinois Commerce Commission Docket No. 14-0244/0225, *Peoples Gas Light & Coke Co. – Proposed Increase in Delivery Service Rates,* PGL Ex. 14.2, p. 1, lines 8, 14, 38 and 42, col. D; Illinois Commerce Commission Docket No. 13-0384, *Commonwealth Edison Company,* AG Ex. 1.0 at 12-13, *citing* ComEd Ex. 3.01, Sch. 2A, p. 13, col. Tot. ICC, line 248.

[2]ICC Docket No. 14-0224/0225, AG Ex. AG/ELPC Ex. 3.0 at 15, 25.

[3]The U.S. Energy Information Administration's Residential Energy Consumption Survey provides detailed household energy usage and demographic data for 27 states or regions of the U.S. referred to as "reportable domains."

[4]*See* Wis. Pub. Serv. Com'n Docket No. 3270-UR-120, *Application of Madison Gas and Electric Co. for Authority to Adjust Electric and Natur4al Gas Rates,* Public Comments of John Howat, National Consumer Law Center, October 3, 2014, *citing* 2009 U.S. EIA Residential Energy Consumption Survey data by "Reportable Domain" at 5-6.

[5]*Id.* at 7-8.

[6]U.S. Energy Information Administration, 2009 Residential Energy Consumption Survey.

[7]*See* ICC Docket No. 14-0224/0225, *North Shore Gas, Peoples Gas Light & Coke Company – Proposed Increase in Gas Rates,* AG Ex. 4.0 at 11-12; AG Ex. 4.1, RDC-5, p.1-3.

[8]U.S. Energy Information Administration, 2009 Residential Energy Consumption Survey.